Technical Reports

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NEWSLETTER IN CENTER FOLD

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UNITED STATES DEPARTMENT OF COMMERCE

Charles Sawyer, Secretary

OFFICE OF TECHNICAL SERVICES

John C. Green, Director

December 1950

THE INCANDESCENT-CARBON BRAZING OF COPPER BUS BARS USED IN THE ELECTROLYTIC REDUCTION OF ALUMINUM

A research project involving the incandescent-carbon brazing of copper bus bars, used in the electrolytic reduction of aluminum, has been successfully completed by the Division of Industrial Research of The State College of Washington at Pullman. The research was done for the Mead plant of the Kaiser Aluminum & Chemical Corporation just north of Spokane. The work at Pullman cost the company $285.00. The joining method perfected by Arthur R. Hard, engineer on the staff of the Division of Industrial Research, will save them approximately $1,000.00 every month.

In the reduction process used at the Mead plant, a cluster of carbon anodes is suspended in each of the many pots in the long pot-lines. The lining of the pot serves as the cathode; molten cryolite, containing the dissolved alumina, is the electrolyte. Each carbon anode is held in position by a copper bus bar which carries the electric current. After a period of time, the bus-bar ends become mechanically deformed and have to be cut off. Eventually, the bar is too short to use and approximately 7/8ths of the bar has to be discarded. In the past, Kaiser Aluminum has found it necessary to replace about one thousand copper bus bars every month.

The company has been salvaging the discarded bars by using the copper for alloying aluminum. However, the difference in cost, between the fabricated copper required for the bus bars and the copper scrap used in alloying, amounts to about $4.00 per bar. This meant that, despite salvaging the copper, the company was losing $4,000.00 a month. Kaiser Aluminum estimates that the cost of joining a bus bar, using the process developed by the Division of Industrial Research, comes to about $3.00 per bar. Thus, company officials report that they are now saving $1,000.00 a month by using the joining method. In the future, this net saving should be increased due to experience and improved techniques.

Prior to the investigation by the Division of Industrial Research, Kaiser Aluminum engineers experimented with heliarc welding on a few sample bars. When these were

placed in service, some failures occurred which discouraged further work by this method. Service failures of the bus bars are extremely dangerous. When a bar breaks, the carbon electrode which it supports drops into the molten electrolyte. The hazards of such a failure are apparent.

The bus bars are about 5 feet long and have a cross-section of 13/16 of an inch by 2 3/8 inches. The incandescent-carbon brazing method consists of clamping the copper bus-bar ends which are to be joined between two carbon electrodes, exerting pressure, and passing a high electrical current through the joint. The resistance of the carbon to passage of the current produces the heat necessary to effect the braze. Before brazing, a thin shim of filler metal is applied to the joint. The shim has a melting point of about 1400 degrees Fahrenheit, while copper does not melt until about 2000 degrees. With the passage of the current, the shim melts; but the copper does not. The heat is concentrated in the joint area, so that it is possible to lay one's hand on the bus bar only a few inches from the joint a moment or two after the current has passed.

Basic requirements of the brazed joint are high tensile strength and high electrical conductivity. A low-conductivity joint would over-heat, melt, and cause a service failure. Mr. Hard's problem was first, to determine the time cycle and transformer size for making a joint; second, to find clamping pressure requirements; third, to recommend procedures for placement and addition of the filler metal; and, fourth, to establish the most efficient joint design.

He determined that a current of 20,000 amperes at 6.2 volts produced the most satisfactory braze. A voltage of 7 was too high and melted the copper. He established the total brazing time as between 20 and 40 seconds, in pulses of 100 cycles (1.67 seconds) each. A clamping pressure of about 1000 pounds was required to produce a good braze.

Before applying the filler metal, the joint area was degreased in ethyl acetate and wire buffed. Mr. Hard experimented with "Sil-Fos" and "Phos-Copper" as brazing alloys and both proved satisfactory in most respects. However, because "Sil-Fos" is available in a size that is easier to position between the bars, Kaiser Aluminum is now using "Sil-Fos" strips 2 1/2 inches wide and 0.010 inches thick as a filler metal. The conductivity of the joined bars is highly satisfactory. Tests of the joint indicate that the average resistance is 2.040 micro-ohms. The resistance of the base metal averages 1.947 micro-ohms. This means that the conductivity of the joint is about 95.44 per cent. In the course of his research, Mr. Hard obtained joint conductivities approaching 97 per cent.

The most efficient joint design was determined by the Division of Industrial Research to be a machined diagonal lap tapering over 2 1/2 inches. In the early work by the Kaiser Company, some torch-brazed specimen bars were prepared. The joint which gave best results under these conditions was a combination butt-lap joint which required high-tolerance machining. This joint did not work out well with the incandescent-carbon process and was simplified to a plain bevel. A simple saw cut is now being used to prepare the parts for joining. One problem in the early phases of the research was to find a suitable material for the brazing electrodes. Eventually, some commercial grades of carbon were found which gave sufficient service life.

Kaiser Aluminum engineers report that they are now brazing with graphite electrodes and a water-cooled, air-operated press. The latter exerts a constant pressure of about 1800 pounds and is connected to the transformer with a 3/4-inch by 4-inch copper bus. The heating and cooling cycles are manually controlled by push buttons.

No bars joined by the incandescent-carbon brazing process have failed, as yet, in service. Tensile strength of the brazed bars averages around 44,500 pounds. In 40 per cent of the tensile tests, the parent metal failed before the joint did. These figures include some preliminary specimens brazed before final procedures were developed.

The budget for this project provides a striking example of how an industrial concern, even a very large one, can profit by availing itself of the specialized facilities and trained personnel of an efficient, state-supported research organization. The invoice which the Division of Industrial Research sent to Kaiser Aluminum included the following items: surplus push-gun welding transformer, $45.00; installation of transformer, $35.00; installation of 20-ton laboratory press, including carbon-brazing blocks, $35.00; wages and overhead, $170.00. Thus, the total cost to the company was only $285.00, plus the bus-bar specimens and filler metals which were furnished to Mr. Hard.

Division of Industrial Research
Washington State Institute of Technology
State College of Washington, Pullman

APPAREL

VENTILATION REQUIREMENTS OF AN IMPERMEABLE PROTECTIVE SUIT: INFLUENCE OF TEMPERATURE, HUMIDITY AND FLOW OF VENTILATING AIR ON THE PHYSIOLOGICAL STRAIN, by Francis N. Craig. U. S. Chemical Corps. Medical Division. Army Chemical Center, Md. Apr 1950. 39p photos, graphs, tables (1 fold) Mi $2.25, Ph $5.00. PB 101511

1. Suits, Protective - Ventilation 2. Temperature - Physiological effects 3. Clothing, Protective - Impermeable 4. CC MD RR 5.

CMLEM-52. Publication control no. 5030-5. Project 4-08-01-02. Test Program no. T4 and T5.

CHEMICAL AND ALLIED PRODUCTS

Dyes

PRESSURE DYEING MACHINERY, REPORTED BY T. F. WARDLE AND A. V. IVITSKY. BIOS TRIP 2923. British Intelligence Objectives Subcommittee. 1947. 50f diagrs Mi $2.50, Enl Pr $7.50. PB 101691

1. Machines, Dyeing - Germany 2. BIOS trip 2923. 3. Micro BIOS FD 676/49, Frames 1-57.

Agricultural Chemicals

THERMAL PRECIPITATOR FOR SPARSE DISPERSIONS OF AEROSOLS, by E. R. Harrington and W. D. Crozier. New Mexico. School of Mines. Research and Development Division. Dec 1948. 21p photos, drawings, tables Mi $2.00, Ph $3.75. PB 101648

A thermal precipitator has been built which is capable of 100 percent collection of aerosols from one liter of air per minute. The collection is deposited on a metal or glass plate in an area of a few square centimeters. The performance of the precipitator somewhat exceeds that predicted by the theory of Cawood, and it is capable of satisfactory collection from some natural atmospheres. It still is not as effective as desired for the very sparse dispersions sometimes met. The greatest value of the device probably will be in collection of particles the sizes of which are below the effective range of impingement devices and as a standard in laboratory studies of the performance of impingement, and other, equipment. Technical report no. 2-NR. Contract N7ONR-405, Task 1. Project Designation no. NR-082-013, Airborne particle Study.

Plastics and Plasticizers

DESCRIPTIVE SHEETS AND TEST REPORTS RELATING TO VARIOUS PRODUCTS EMPLOYED IN THE PRODUCTION OF PLASTICS, PT. II. I. G. Farbenindustrie A. G., Ludwigshafen, Ger. 1937-1945. 518f photos, graphs (Text in German) Mi $9.00, Enl Pr $68.75. PB 101007

1. Micro BIOS FD 968/48, Frames 501-1019.

For pt. I see PB 101006.

EXPERIMENTS ON PEAK PRODUCTION OF VINYL CHLORIDE AND ON THE TEMPERATURE OF COOLING OIL IN VINYL CHLORIDE REACTION TOWERS. I. G. Farbenindustrie A. G., Schkopau, Ger. 1941. 17f graphs, tables (Text in German) Mi $1.75, Enl Pr $3.75. PB 101542

1. Vinyl chloride - Production - Germany 2. Micro BIOS FD 2647/47, Frames 21-35.

Abstract available as PB 101542s. 2p. Mi $1.25, Ph $1.25.

PLASTICIZERS FOR IGELIT, THEIR TESTING AND THE BRABENDER EQUIPMENT FOR RAPID DETERMINATION OF MOISTURE CONTENT. I. G. Farbenindustrie A. G., Schkopau, Ger. 1939-1944. 44f tables (Text in German) Mi $2.50, Enl Pr $7.50. PB 101521

1. Brabender moisture tester 2. Plasticizers - Tests - Germany 3. Micro BIOS FD 1161/49, Frames 1-43.

English abstract included.

PRODUCTION, SALES, AND DELIVERIES OF MONOMERIC VINYL CHLORIDE. I. G. Farbenindustrie A. G., Schkopau, Ger. 1940-1944. 426f (Text in German) Mi $9.00, Enl Pr $56.25. PB 101535

1. Vinyl chloride - Production - Germany 2. Micro BIOS FD 2654/47, Frames 1-428.

Abstract available as PB 101535s. 1p. Mi $1.25, Ph $1.25.

RULES FOR CLIMATIC TESTS OF PLASTICS, IN PARTICULAR RESISTANCE TO TROPICAL CONDITIONS. I. G. Farbenindustrie A. G., Schkopau, Ger. 1944. 13f (Text in German) Mi $1.75, Enl Pr $3.75. PB 101607

1. Plastics - Tests - Germany 2. Plastics - Tropical deterioration - Germany 3. Micro BIOS FD 2357/47, Frames 1-11.

Abstract available as PB 101607s. 2p. Mi $1.25, Ph $1.25.

TESTING STANDARDS FOR IGELIT. I. G. Farbenindustrie A. G., Schkopau, Ger. 1941-1943. 24f photos, graphs, tables (Text in German) Mi $2.00, Enl Pr $5.00. PB 101604

1. Igelit PCU (Trade name) 2. Plastics - Tests - Germany 3. Micro BIOS FD 1154/49, Frames 1-22.

Abstract available as PB 101604s. 2p. Mi $1.25, Ph $1.25. Includes Prüfverfahren für kunststoffrohstoffe und -fertigerzeugnisse, by P. Nowak and W. Esch reprinted from Kunststoffe jahrg. 33, Mar 1943, seite 80-83.

Paints, Varnishes and Lacquers

ONE COAT PAINT PROJECT: EIGHTH QUARTERLY REPORT, by Max Kronstein and Charles J. Marsel. New York University. College of Engineering. Engineering Research Division. Sep 1948. 222p photos, graphs, tables Mi $8.00, Ph $28.75. PB 101680

This report presents a summary of the major aspects of work accomplished in the first two years, as well as a detailed report of new work done in the last three months of the contract period. In doing so, the basic research work will be presented separately from the special work in respect to the olive drab camoflage paints which had been the special point of interest in this project. The special studies in respect to the factors influencing adhesion and the methods of comparing adhesion conditions will be given in another section. Sections on new possible paint develop-

ments are concluding this report. Contract W26-039-sc-32250. Report contains a summary of the work of the seven earlier reports as well as a Progress report on the results of work covering the period Jun 30, 1948 to Sep 30, 1948. A new contract W36-039-sc-39181 has been received, beginning Nov 1, 1948. Project no. 85. Technical report 85.08. Quarterly report no. 8.

Chemical Engineering and Equipment

BESCHREIBUNG EINER ANLAGE ZUR ERZEUGUNG VON 550.000 N_M3 SYNTHESE-IDEAL-GAS/TAG NACH DEM LURGI-DRUCKVERGASSUNGSVERFAHREN (DESCRIPTION OF A PLANT FOR PRODUCTION OF 550,000 CUBIC METERS OF SYNTHETIC-IDEAL-GAS PER DAY ACCORDING TO THE LURGI PRESSURE GASIFICATION PROCESS). Lurgi Gesellschaft für Wärmetechnik m.b.H., Frankfurt am Main, Ger. Oct 1939. 49f drawings (Text in German) Mi $2.50, Enl Pr $7.50. PB 101326

1. Lurgi high pressure gasification process 2. Gas - Purification - Plant design - Germany 3. Gas - Synthesis - Germany 4. Micro BIOS FD 1802/47, Frames 1-49.
Includes flow sheets, cost analyses, etc. for Synthesewerk Falkenau. Drawings and some other frames will not reproduce well.

COST CALCULATIONS OF VINYL CHLORIDE PLANT. UTILIZATION OF WASTE LIQUOR. I. G. Farbenindustrie A. G., Schkopau, Ger. 1938-1944. 65f tables (Text in German) Mi $3.00, Enl Pr $10.00. PB 101533

1. Vinyl chloride - Production - Germany 2. Waste liquor - Uses - Germany 3. Micro BIOS FD 2653/47, Frames 1-64.
Abstract available as PB 101533s. 1p. Mi $1.25, Ph $1.25.

COSTINGS FOR THE PHTHALIC ACID PLANT. I. G. Farbenindustrie A. G., Schkopau, Ger. 1937-1943. 148f tables (Text in German) Mi $5.75, Enl Pr $20.00. PB 101570

1. Phthalic acid - Production cost - Germany 2. Micro BIOS FD 2572/47, Frames 1-146.
Abstract available as PB 101570s. 1p. Mi $1.25, Ph $1.25.

DESCRIPTION AND BLUEPRINTS OF THE GLYCERINE D (MONOGLYCOL, TRIGLYCOL) PLANT. I. G. Farbenindustrie A. G., Schkopau, Ger. 1939-1941. 42f drawings (Text in German) Mi $2.50, Enl Pr $7.50. PB 101572

1. Diethylene glycol - Production - Germany 2. Triethylene glycol - Production - Germany 3. Micro BIOS FD 2629/47, Frames 1-23.
Abstract available as PB 101572s. 1p. Mi $1.25, Ph $1.25. See also PB 101571 and PB 101573-101574.

DESCRIPTION AND INSTRUCTIONS FOR AIR SEPARATION APPARATUS OF OXYGEN PLANTS ACCORDING TO LINDE-FRÄNKEL PROCESS. Sächsische Werke. Gaswerk, Böhlen, Ger. 1944. 19f (Text in German and English) Mi $1.75, Enl Pr $3.75. PB 101352

1. Oxygen - Production - Apparatus - Germany 2. Linde-Frānkel apparatus 3. Micro BIOS FD 3186/46, Frames 1-19.
Sketch of air separation apparatus is omitted. Abstract available as PB 101352s. 1p. Mi $1.25, Ph $1.25.

EQUIPMENT FOR THE MANUFACTURE OF CELLULOSE ACETATE. I. G. Farbenindustrie A. G., Leverkusen, Ger. Mar 1941. 19p drawings (Text in German and English) Mi $1.75, Ph $2.50. PB 101406
1. Cellulose acetates - Production - Germany 2. Machinery - Design - Germany 3. Micro BIOS FD 2775/46, Frames 1-17.
List of drawings in English. Abstract available as PB 101406s. 1p. Mi $1.25, Ph $1.25.

EQUIPMENT OF THE VINYL CHLORIDE PLANT. I. G. Farbenindustrie A. G., Schkopau, Ger. 1937-1944. 110f photos, tables (Text in German) Mi $4.50, Enl Pr $15.00. PB 101541
1. Vinyl chloride - Production - Germany 2. Vinyl chloride - Production - Equipment - Germany 3. Micro BIOS FD 2652/47, Frames 1-108.
Abstract available as PB 101541s. 1p. Mi $1.25, Ph $1.25.

FERROPRINTS OF ETHYL CHLORIDE PLANT. EXPERIMENTS ON PRODUCTION OF ETHYL CHLORIDE BY HYDROGENATION OF VINYL CHLORIDE. I. G. Farbenindustrie A. G., Schkopau, Ger. 1938-1943. 18f drawings (Text in German) Mi $1.75, Enl Pr $3.75. PB 101575
1. Ethane, Chloro - Production - Germany 2. Vinyl chloride - Hydrogenation - Germany 3. Micro BIOS FD 2639/47, Frames 1-8.
Abstract available as PB 101575s. 1p. Mi $1.25, Ph $1.25.

MONTHLY REPORTS OF THE ETHYL CHLORIDE PLANT. I. G. Farbenindustrie A. G., Schkopau, Ger. 1940-1944. 79f diagrs, tables (Text in German) Mi $3.50, Enl Pr $11.25. PB 101539
1. Ethane, Chloro - Production - Germany 2. Micro BIOS FD 2630/47, Frames 1-38.
Abstract available as PB 101539s. 1p. Mi $1.25, Ph $1.25.

POLYMERIZATION, ISOMERIZATION, CATALYTIC CRACKING, AND RELATED PROCESSES, AND METHODS AND PLANT FOR THE MANUFACTURE OF CATALYSTS. Ruhrchemie A. G., Oberhausen-Holten, Ger. 1938-1944. 273f drawings, diagrs, graphs (Text in German) Mi $9.00, Enl Pr $37.50. PB 101518
1. Catalysts - Production - Germany 2. Isomerization - Germany 3. Polymerization - Germany 4. Micro BIOS FD 5598/47, Frames 1-246.
Abstract available as PB 101518s. 2p. Mi $1.25, Ph $1.25.

PRODUCTION OF TETRAHYDROFURAN AND TERTIARY BUTYL ETHERS, TESTING OF JET ENGINE FUELS, MEASURING AND TESTING INSTRUMENTS, PROCESS DATA FOR METHANE CRACKING PLANT, AND MISCELLANEOUS MATTERS. I. G. Farbenindustrie A. G., Ludwigshafen, Ger. 1937-1944. 411f photos, diagrs, tables (Text in German) Mi $9.00, Enl Pr $65.00. PB 101692
1. Furan, Tetrahydro - Production - Germany 2. Butyl ether - Production - Germany 3. Jet engines - Fuels - Tests - Germany 4. Instruments, Measuring - Germany 5. Methane - Cracking - Germany 6. Micro BIOS FD 139/47, Frames 1-356.
Abstract available as PB 101692s. 2p. Mi $1.25, Ph $1.25.

ZEICHNUNGSLISTE (LIST OF PLANT ITEMS FOR A PROJECT FACTORY AT LANDSBERG FOR THE MANUFACTURE OF CELLULOSE ACETATE). Cellitfabrik Landsberg, Landsberg, Ger. n.d. 55f (Text in German) Mi $2.75, Enl Pr $8.75. PB 101402
1. Cellulose acetates - Production - Plants - Germany 2. Micro BIOS FD 2776/46, Frames 1-54.
Contains list of main items in English.

CALCULATION, PROCESSING, ETC. OF GLYCERINE D. I. G. Farbenindustrie A. G., Schkopau, Ger. 1939-1944. 75f graph, tables (Text in German) Mi $3.50, Enl Pr $11.25. PB 101573
1. Diethylene glycol - Production - Germany 2. Triethylene glycol - Production - Germany 3. Micro BIOS FD 2631/47, Frames 1-69.
Abstract available as PB 101573s. 2p. Mi $1.25, Ph $1.25. See also PB 101571-101572, 101574.

CELLULOSE ACETATE, CELLULOSE ESTERS, ETC. FOR TEXTILE AND OTHER INDUSTRIES. I. G. Farbenindustrie A. G., Dormagen, Ger. 1936-1944. 374f (Text in German) Mi $9.00, Enl Pr $50.00. PB 101401
1. Cellulose acetates - Production - Germany 2. Cellulose - Esters - Preparation - Germany 3. Micro BIOS FD 2777/46, Frames 1-361.
English abstract included.

CELLULOSE ACETATE PRODUCTION BY METHYLENECHLORIDE PROCESS. I. G. Farbenindustrie A. G., Dormagen, Ger. 1938-1942. 71p photo, drawings (Text in German) Mi $3.50, Ph $10.00. PB 101405
1. Cellulose acetates - Production - Germany 2. Micro BIOS FD 2265/46, Frames 1-71.
Abstract available as PB 101405s. 2p. Mi $1.25, Ph $1.25.

CORRESPONDENCE, STATISTICAL RETURNS, ETC. OF THE GLYCERINE D PLANT. I. G. Farbenindustrie A. G., Schkopau, Ger. 1941-1944. 217f (Text in German) Mi $7.75, Enl Pr $28.75. PB 101574
1. Diethylene glycol - Production - Germany 2. Triethylene glycol - Production - Germany 3. Micro BIOS FD 2634/47, Frames 1-211.
Abstract available as PB 101574s. 1p. Mi $1.25, Ph $1.25. See also PB 101571-101573.

COST CALCULATIONS, ETC. FOR GLYCERINE D, GLYCOL, PROPYLENE OXIDE, AND ETHYL CHLORIDE, ETC. I. G. Farbenindustrie A. G., Schkopau, Ger. 1938-1944. 173f graphs, tables (Text in German) Mi $6.50, Enl Pr $23.75. PB 101534
1. Glycerine - Production costs - Germany 2. Glycol - Production costs - Germany 3. Propylene oxide - Production costs - Germany 4. Ethane, Chloro - Production costs - Germany 5. Micro BIOS FD 2637/47, Frames 1-164.
Abstract available as PB 101534s. 1p. Mi $1.25, Ph $1.25.

DARSTELLUNG VON PHOSPHORVERBINDUNGEN UND IHRE ANWENDUNG IN SCHMIERMITTELN (PREPARATION OF PHOSPHOROUS COMPOUNDS AND THEIR USE IN LUBRICANTS), by Gerd Müller. Jan 1944. 246f photos, drawings, graphs (Text in German and English) Mi $9.00, Enl Pr $32.50. PB 101602
1. Phosphorus compounds - Preparation - Germany 2. Phosphorus compounds - Uses - Germany 3. CIOS XXV-24 LD 4. Micro BIOS FD 2873/46, Item 18, Frames 1-191.
Diss.-Technische Hochschule, Stuttgart. Abstract available as PB 101602s. 1p. Mi $1.25, Ph $1.25. Listed in CIOS XXV-24.

ENRICHMENT OF SULPHUR DIOXIDE-CONTAINING GASES BY ABSORPTION, by Drs. Weidmann and Schneider. Metallgesellschaft A. G., Frankfort, Ger. Jan-Feb 1932. 34f diagrs, graphs, tables (Text in German) Mi $2.25, Enl Pr $6.25. PB 101526

1. Sulfur dioxide - Absorption - Germany 2. BIOS FR 335 LD 3. Micro BIOS FD 4838/47, Frames 1-34.

Abstract available as PB 101526s. 1p. Mi $1.25, Ph $1.25. Listed in BIOS FR 335.

EQUIPMENT FOR A TWO-TOWER PROCESS FOR ETHYLENE CHLOROHYDRIN REACTION. I. G. Farbenindustrie A. G., Schkopau, Ger. 1944. 21f drawings (Text in German) Mi $2.00, Enl Pr $5.00. PB 101532

1. Ethanol, 2-Chloro - Production - Germany 2. Micro BIOS FD 2645/47, Frames 1-16.

Abstract available as PB 101532s. 1p. Mi $1.25, Ph $1.25.

EXPERIMENTS FOR THE PRODUCTION OF METHANOL BY HIGH PRESSURE SYNTHESIS. Ruhrchemie A. G., Oberhausen-Holten, Ger. Jul-Oct 1943. 34f tables (Text in German) Mi $2.25, Enl Pr $6.25. PB 101347

1. Methanol - Production - Germany 2. Micro BIOS FD 930/49, Frames 1-34.

Abstract available as PB 101347s. 1p. Mi $1.25, Ph $1.25.

THE GERMAN CHEMICAL INDUSTRY, A BIBLIOGRAPHY OF THE CHEMICAL, METALLURGICAL, AND PROCESS INDUSTRIES, by L. Wilson Greene. Jul 1950. 369p Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $10.00. PB 101458

1. Chemistry - Bibliography - Germany 2. Metallurgy - Bibliography - Germany 3. Processes, Chemical - Bibliography - Germany.

GEWINNUNG VON ELEMENTARSCHWEFEL AUS SCHWEFELWASSERSTOFF-HALTIGEN GASEN (PRODUCTION OF SULPHUR FROM GASES CONTAINING HYDROGEN-SULPHIDE), by Dr. M. Wohlwill. Metallgesellschaft A. G., Frankfort, Ger. Jun 1938. 34f (Text in German) Mi $2.25, Enl Pr $6.25. PB 101280

1. Sulfur - Production - Germany 2. BIOS FR 335 LD 3. Micro BIOS HEC 12079 4. Micro BIOS FD 4855/47, Frames 67-98.

Abstract available as PB 101280s. 1p. Mi $1.25, Ph $1.25. Report 1680 as listed in BIOS FR 335 under HEC 12079.

HYDROGENATION OF CARBON MONOXIDE WITH THE ADDITION OF ACETYLENE. Ruhrchemie A. G., Oberhausen, Ger. 1939-1941. 56f tables (Text in German and English) Mi $2.75, Enl Pr $8.75. PB 101278

1. Carbon monoxide - Hydrogenation - Germany 2. Micro BIOS FD 5561/47, Frames 1-57.

Abstract available as PB 101278s. 2p. Mi $1.25, Ph $1.25.

MANUFACTURE OF CELLULOSE ACETATE, by Dr. Harz. I. G. Farbenindustrie A. G., Dormagen, Ger. Sep 1940-Jun 1941. 9p (Text in German) Mi $1.25, Ph $1.25. PB 101407

1. Cellulose acetates - Production - Germany 2. Micro BIOS FD 2777A/46, Frames 1-8.

Abstract available as PB 101407s. 1p. Mi $1.25, Ph $1.25.

MANUFACTURE OF CHLOROBENZENE. FUTURE DEVELOPMENT WORK. Ruhrchemie A. G., Oberhausen-Holten, Ger. 1941-1944. 4f (Text in German) Mi $1.25, Enl Pr $1.50. PB 101283
1. Benzene, Chloro - Production - Germany 2. Micro BIOS FD 5577/47, Frames 016-019.
Abstract available as PB 101283s. 2p. Mi $1.25, Ph $1.25.

MONTHLY REPORTS OF THE GLYCERINE D (DIGLYCOL) PLANT, MAR 1940-DEC 1944. I. G. Farbenindustrie A. G., Schkopau, Ger. 1940-1945. 105f graphs, tables (Text in German) Mi $4.50, Enl Pr $15.00. PB 101571
1. Diethylene glycol - Production - Germany 2. Triethylene glycol - Production - Germany 3. Micro BIOS FD 2628/47, Frames 1-103.
Abstract available as PB 101571s. 2p. Mi $1.25, Ph $1.25. For description and drawings of the plant see PB 101572; for details of equipment see PB 101539 and PB 101573-101574.

MONTHLY REPORTS ON AS-DICHLOROETHYLENE PRODUCTION, APR 1943-MAR 1944. I. G. Farbenindustrie A. G., Schkopau, Ger. 1943-1944. 13f (Text in German) Mi $1.75, Enl Pr $3.75. PB 101597
1. Ethylene, 1,1-Dichloro - Production - Germany 2. Micro BIOS FD 2671/47, Frames 1-12.
Abstract available as PB 101597s. 1p. Mi $1.25, Ph $1.25.

OLEOPHOBIC MONOLAYERS. III. WETTING EFFECTS AND ADHESIONAL ENERGIES, by Elaine G. Shafrin and W. A. Zisman. U. S. Naval Research Laboratory. Jun 1950. 16p graphs, tables Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. Mimeo: $.50. PB 101486
A variety of organic and inorganic liquids exhibit finite contact angles against an oleophobic monolayer of octadecylamine adsorbed on platinum. Some simple relations are found between the contact angle (θ) and the surface tension (γ). A critical minimum surface tension γ_c specific to the substrate exists which must be exceeded in order that a liquid exhibit a finite contact angle. Values of the adhesion tension are calculated and approximate calculations are made for the work of adsion, W_A. The values of W_A minus W_C (the work of cohesion) bear separate but similar curvilinear relationships to γ for the several groups of liquids. NRL R3674.

PROCESSES FOR THE MANUFACTURE OF ACETONE AND "DIPHENOLACETONE". I. G. Farbenindustrie A. G., Schkopau, Ger. Feb 1940-Feb 1942. 17f (Text in German) Mi $1.75, Enl Pr $3.75. PB 101606
1. Acetone - Production - Germany 2. Methane, Bis (p-hydroxydiphenyl) dimethyl - Germany 3. Micro BIOS FD 2059/47, Frames 1-15.
Abstract available as PB 101606s. 2p. Mi $1.25, Ph $1.25.

RATE CONSTANTS IN LIQUID VINYL ACETATE POLYMERIZATION, SEPTEMBER 1947 - SEPTEMBER 1948, by Paul D. Bartlett and Harold Kwart. Harvard University, Cambridge, Mass. Jun 1949. 83p photos, drawings, graphs, tables Mi $3.75, Ph $11.25. PB 101649
After several improvements in the technique of the rotating sector method as heretofore employed in these laboratories, the rate constants of vinyl acetate polymeri-

zation have been redetermined with greater precision. A program of study on free radical chain reactions is now in progress, using the methods and procedures developed in the course of the work reported here. Technical report no. 1 to the Office of Naval Research under Project no. NR-056-095. Contract no. N5ori - 76 Task XX.

STABILITY OF COPPER FERROCYANIDE GELS AGAINST H_2O AND STRONG ELECTROLYTES OF NACL AND $K_4FE(CN)6$, by Ivar H. Sanick. 1949. 12p photo, graphs Mi $1.75, Ph $2.00. PB 101514

Copper ferrocyanide gels are formed with different reaction velocities according to the order in which the copper sulfate- and potassium ferrocyanide solutions are mixed. Out washings of copper ferrocyanide gels with distilled water shows the complex compound to be stable. The gels have high adsorption power for alkali ferrocyanides. In ion exchange with sodium chloride there is no break-down of the gels. However if the process is reversed with alkali ferrocyanides a slight breakdown is noted. Copper ferrocyanide gels could be used as electrolytic gels in galvanic elements and for reducing the ground resistance in electrical constructions. Tekniska Skrifter utgivna av Svenska Teknologföreningen, nr 141. Acta polytechnica no. 53. 1949.

SULFIDIN-VERSUCHE (CONCENTRATION AND PURIFICATION OF SULPHUR DIOXIDE FROM ROAST GASES ACCORDING TO THE SULPHIDINE PROCESS). Metallgesellschaft A. G., Frankfort, Ger. 1936. 51f tables (Text in German) Mi $2.75, Enl Pr $8.75. PB 101279

1. Sulfur dioxide - Purification - Germany 2. BIOS FR 335 LD 3. Micro BIOS FD 4847/47, Frames 1-50.

Abstract available as PB 101279s. 2p. Mi $1.25, Ph $1.25. Reports 1581, 1582, 1589, 1592, listed in BIOS FR 335 as HEC 12059, 12060, 12061, 12063.

TWO-TOWER PROCESS FOR THE ETHYLENE CHLOROHYDRIN AND PROPYLENE CHLOROHYDRIN REACTION. I. G. Farbenindustrie A. G., Schkopau, Ger. 1941-1942. 20f drawings (Text in German) Mi $1.75, Enl Pr $3.75. PB 101578

1. Ethanol, 2-Chloro - Production - Germany 2. 2-Propanol, 1-Chloro - Production - Germany 3. Micro BIOS FD 2644/47, Frames 1-19.

Abstract available as PB 101578s. 1p. Mi $1.25, Ph $1.25.

TYPES, AND THE MANUFACTURE, OF CATALYSTS EMPLOYED IN THE HYDROCARBON AND PARAFFIN WAX SYNTHESES. Ruhrchemie A. G., Oberhausen-Holten, Ger. 1935-1945. 475f drawings, graphs, tables (Text in German) Mi $9.00, Enl Pr $60.00. PB 101733

1. Hydrocarbons - Catalysts - Germany 2. Paraffin wax - Catalysts - Germany 3. Catalysts - Production - Germany 4. Micro BIOS FD 5612/47, Frames 1-425.

English abstract available as PB 101733s. 1p. Mi $1.25, Ph $1.25.

ÜBER DEN UMSATZ AN UNSEREN PLATIN-KONTAKTEN. SCHEIBEN KONTAKT ODER PLATINNETZ? (RATE OF CONVERSION ON PLATINUM CATALYSTS USED IN MANUFACTURE OF NITRIC ACID. DISC-SHAPED OR PLATINUM GAUGE?), by Spanin. Ruhrchemie A. G., Oberhausen-Holten, Ger. Jan 1945. 14f graphs, tables (Text in German) Mi $1.75, Enl Pr $3.75. PB 101734

1. Catalysts, Platinum - Germany 2. Nitric acid - Production - Germany 3. Micro BIOS FD 5570/47, Frames 1-15.

Abstract available as PB 101734s. 1p. Mi $1.25, Ph $1.25.

ÜBER DIE HERSTELLUNG VON PHENYLBETANAPHTHYLAMIN (PRODUCTION OF PHENYL-BETA-NAPHTHYLAMINE), by Goetz. I. G. Farbenindustrie A. G., Ludwigshafen, Ger. May 1950. 4f (Text in German) Mi $1.25, Enl Pr $1.50.
PB 101528

1. 2-Naphthylamine, N-phenyl - Production - Germany 2. Kauteko (Anwendungstechnische Kommission für Kautschuk) 3. Micro BIOS FD 1324/48, Frames 1-3.
Abstract available as PB 101528s. 1p. Mi $1.25, Ph $1.25.

VERSUCHE ZUR HERSTELLUNG VON EMULSIONEN DURCH SCHALLSCHWINGUNGEN HOHER FREQUENZ (PREPARATION OF EMULSIONS BY ULTRASONICS), by Dr. H. Schoefer. Siemens & Halske A. G., Berlin. Sep 1946. 5f drawing, diagr (Text in German) Mi $1.25, Enl Pr $1.50. PB 101525

1. Emulsions - Preparation - Germany 2. Ultrasonics - Research - Germany 3. Micro BIOS FD 5295/47, Frames 1-5.
Abstract available as PB 101525s. 1p. Mi $1.25, Ph $1.25.

DETERIORATION STUDIES

INTERIM REPORT OF THE DEPARTMENTAL COMMITTEE ON THE DETERIORATION OF CAST IRON AND SPUN IRON PIPES. Gt. Brit. Ministry of Health. Departmental Committee on the Deterioration of Cast Iron and Spun Iron Pipes. 1950. 59p photos, graphs, fold. col. map Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.90. PB 101452

Chemical and bacterial causes of corrosion described; data on British soils; recommendations of methods to reduce corrosion; metallographs. S. O. Code no. 32-396*. Color in map will not reproduce.

ELECTRICAL MACHINERY, EQUIPMENT AND SUPPLIES

Communication Equipment

DETERMINATION OF MODIFIED INDEX OF REFRACTION PROFILES AND WAVE ATTENUATION FROM RADIO DATA, by A. W. Straiton and A. H. LaGrone. Texas. University. Electrical Engineering Research Laboratory. Apr 1949. 24p graphs Mi $2.00, Ph $3.75. PB 101635

In this report, the attenuation factor and modified index of refraction-height curves are determined from radio data and compared with the meteorologically measured modified index of refraction curves and the related attenuation factor. The wave length used was 3.2 centimeters. Four individual sets of radio data with overwater path lengths of 12.3, 31.6, 40 and 47.4 miles are considered and related to the average meteorological conditions. Prepared under U. S. Navy Contract N5ori-136, Task Order I. TU EERL 25

RADIATION FROM A CIRCULAR DIFFRACTION ANTENNA, by C. H. Papas. Harvard University. Cruft Laboratory. Apr 1949. 15p diagrs Mi $1.75, Ph $2.50.
PB 101668

This report generalizes a study made by Pistolkors of the electromagnetic field produced by a circular diffraction antenna which consists of a circular gap cut in a perfectly conducting plane. The generalization is based on the assumption that the field in the gap has the distribution of the dominant incident mode of the feeding coaxial line instead of being assumed constant. The general formula derived in this paper reduces to Pistolkors' expression for small values of the gap. Research reported in this document was made possible through support extended Cruft Laboratory, Harvard University, jointly by the Navy Department (Office of Naval Research), the Signal Corps of the U. S. Army and the U. S. Air Force, under ONR contract N5-ori-76, Task order no. 1. NR-078-011. HU CL TR 76.

TELEPHONE APPARATUS FOR USE ON HIGH-TENSION LINES. Siemens & Halske A. G., Berlin. 1946. 21f diagrs (Text in German) Mi $2.00, Enl Pr $5.00. PB 101400

1. Telephones - Apparatus - Germany 2. Micro BIOS FD 4488/47, Frames 1-18.
Abstract available as PB 101400s. 2p. Mi $1.25, Ph $1.25.

Electronics

HOCHVAKUUMROENTGENBLITZROHR (HIGH VACUUM TUBE FOR GENERATING X-RAY FLASH DISCHARGES). Siemens & Halske A. G., Berlin. 1946. 5f photo, diagr (Text in German) Mi $1.25, Enl Pr $1.50. PB 101527

1. X-ray tubes - Flash - Germany 2. Vacuum tubes, High frequency - Germany 3. Micro BIOS FD 1070/49, Frames 1-5.
Abstract available as PB 101527s. 1p. Mi $1.25, Ph $1.25.

MEASUREMENT OF CURRENT DISTRIBUTION ALONG COUPLED ANTENNAS, FOLDED DIPOLES AND SHUNT-FED PLATES, by T. Morita and C. E. Faflick. Harvard University. Cruft Laboratory. Feb 1949. 25p photo, diagr, graphs, tables Mi $2.00, Ph $3.75. PB 101671

The theoretical analysis of coupled antennas is carried out advantageously by representing the current in each element as a superposition of symmetrical (codirectional) and antisymmetrical (oppositely directed) components of current. It is the purpose of this paper to verify experimentally this physical concept of currents in coupled antennas and folded dipoles and to attempt to extend the method of analysis to shunt-fed-plate and frame antennas. Research reported in this document was made possible through support extended Cruft Laboratory, Harvard University, jointly by the Navy Department (Office of Naval Research) and the Signal Corps, U. S. Army, under contract N5-ori-76, Task order no. 1. NR-078-011. HU CL TR 67.

MEASUREMENT OF TRANSDUCER IMPUT AND OUTPUT, by J. S. Mendousse, W.G. Cady and P. D. Goodman. Wesleyan University. Scott Laboratory of Physics, Middletown, Conn. Feb 1949. 29p drawings, table Mi $2.00, Ph $3.75. PB 101670

1. Transducer, Crystal 2. Circuits, High frequency - Measuring equipment 3. Radiometers, Cavity.
Technical report no. 3. Contents: Circuits for measuring high-frequency electrical power, by J. S. Mendousse. - Cavity radiometer, by W. G. Cady and P. D. Goodman. Office of Naval Research contract N6onr-262, Task order I. NR 014-401.

PIEZOELECTRIC INVESTIGATIONS. FIRST SEMI-ANNUAL TECHNICAL REPORT ON CONTRACT NO. W28-003-SC-1556 TO U. S. ARMY SIGNAL CORPS. Wesleyan University. Scott Laboratory of Physics, Middletown, Conn. Feb 1946. 86p photos, drawings, graphs, tables Mi $3.75, Ph $11.25. PB 101636

Preliminary considerations on research aimed to help in establishing specifications of intrinsic properties of crystal which by providing appropriate technical description. Theory of electrical parameter for thickness shear piezoelectric resonators and growth rings are discussed. A translation of R. Bechmann's paper on the characteristics of quanity oscillation and resonators is included. For 2d-10th reports see PB 101637-PB 101647s.

PIEZOELECTRIC INVESTIGATIONS. SECOND SEMI-ANNUAL TECHNICAL REPORT ON CONTRACT NO. W28-003-SC-1556 TO U. S. ARMY SIGNAL CORPS. Wesleyan University. Scott Laboratory of Physics, Middletown, Conn. Jul 1946. 161p 1hotos, drawings, graphs Mi $6.25, Ph $21.25. PB 101637

A report of progress toward the goals of protection of the circuit behavior of high-frequency quality plates of known dimension and of specification of the geometry of crystal units which are to provide desired admittance characteristics. Consists largely in the establishment of methods and techniques for measurement and in the comparison of trial or exploratory measured values with others obtained from more basic data by theoretical methods. For 1st, 3rd - 10th reports see PB 101636, PB 101638-PB 101647s.

PIEZOELECTRIC INVESTIGATIONS. THIRD SEMI-ANNUAL TECHNICAL REPORT ON CONTRACT NO. W28-003-SC-1556 TO U. S. ARMY SIGNAL CORPS. Wesleyan University. Scott Laboratory of Physics, Middletown, Conn. Jan 1947. 173p photos, diagrs, drawings, tables Mi $6.50, Ph $22.50. PB 101638

1. Crystals, Quartz - Properties 2. Crystals, Quartz - X-ray spectra 3. Crystals, Piezoelectric - Research 4. Radio frequencies - Research.

Contents: Part I. On the circuit properties of quartz crystals. 109p. - Part II. Differential reactions of quartz to electrical etching and to x-irradiation, by Clyde P. Glover. Thesis, Wesleyan University. For 1st-2nd, 4th-10th reports see PB 101636 - PB 101637, PB 101639-PB 101647s.

PIEZOELECTRIC INVESTIGATIONS. FOURTH SEMI-ANNUAL TECHNICAL REPORT ON CONTRACT NO. W28-003-SC-1556 TO U. S. ARMY SIGNAL CORPS. Wesleyan University. Scott Laboratory of Physics, Middletown, Conn. Jul 1947. 70p photos, diagrs, drawings, tables Mi $3.00, Ph $8.75. PB 101639

1. Crystals, Quartz - Plane-wave analysis 2. Crystals, Piezoelectric - Research 3. Radio frequencies - Research.

For 1st - 3rd, 5th-10th reports see PB 101636 - PB 101638, PB 101640-PB 101647s. Chapter I. Plane wave analysis of vibrations in plane-parallel plates, by Gunnar Hok.

PIEZOELECTRIC INVESTIGATIONS. FIFTH SEMI-ANNUAL TECHNICAL REPORT ON CONTRACT NO. W28-003-SC-1556 TO U. S. ARMY SIGNAL CORPS. Wesleyan University. Scott Laboratory of Physics, Middletown, Conn. Part I. Jan 1948. 93p diagrs, graphs, tables Mi $4.25, Ph $12.50. PB 101640

1. Plates, Anisotropic 2. Crystals, Aluminum phosphate 3. Crystals, Piezoelectric - Research 4. Radio frequencies - Research.

See PB 101641 for Part II. For 1st - 4th, 5th, Part II - 10th reports see PB 101636-PB 101639, PB 101641-PB 101647s. Contains: Chap. I. Thickness-shear vibrations of thin anisotropic plates, by Gunnar Hok, p. 1-45.

PIEZOELECTRIC INVESTIGATIONS. SIXTH SEMI-ANNUAL TECHNICAL REPORT ON CONTRACT NO. W28-003-SC-1556 TO U. S. ARMY SIGNAL CORPS. Wesleyan University. Scott Laboratory of Physics, Middletown, Conn. Part I. Jul 1948. 27p diagrs, graphs, tables Mi $2.00, Ph $3.75. PB 101642

1. Crystals, Piezoelectric - Research 2. Radio frequencies - Research 3. Crystals, Quartz - Analysis.

See PB 101643 for Part II. For 1st - 5th, 6th Part II - 10th reports see PB 101636-PB 101641, PB 101643 - PB 101647s.

PIEZOELECTRIC INVESTIGATIONS. SIXTH SEMI-ANNUAL TECHNICAL REPORT ON CONTRACT NO. W28-003-SC-1556 TO U. S. ARMY SIGNAL CORPS. Wesleyan University. Scott Laboratory of Physics, Middletown, Conn. Part II. Jul 1948. 112p diagrs Mi $4.75, Ph $15.00. PB 101643

1. Crystals, Piezoelectric - Research 2. Radio frequencies - Research.

See PB 101642 for Part I. For 1st - 6th, Part I, 7th - 10th reports see PB 101636-PB 101642, PB 101644-PB 101647s. Contents: Manual of piezoelectric data, by Karl S. Van Dyke (Vol. II). 111p. For Vols I, III, and 2nd ed. (Parts I-II), see PB 101641, PB 101646, PB 101647 and PB 101647s.

PIEZOELECTRIC INVESTIGATIONS. SEVENTH SEMI-ANNUAL TECHNICAL REPORT ON CONTRACT NO. W28-003-SC-1556 TO U. S. ARMY SIGNAL CORPS. Wesleyan University. Scott Laboratory of Physics, Middletown, Conn. May 1949. 58p diagrs, drawings, graphs, tables Mi $2.75, Ph $7.50. PB 101644

1. Crystals, Piezoelectric - Research 2. Radio frequencies - Research 3. Resonators, Piezoelectric.

For 1st - 6th, 8th - 10th reports see PB 101636 - PB 101643, PB 101645-PB 101647s.

PIEZOELECTRIC INVESTIGATIONS. EIGHT SEMI-ANNUAL TECHNICAL REPORT ON CONTRACT NO. W28-003-SC-1556 TO U. S. ARMY SIGNAL CORPS. Wesleyan University. Scott Laboratory of Physics, Middletown, Conn. Nov 1949. 54p diagrs, drawings, graphs, tables Mi $2.75, Ph $7.50. PB 101645

1. Crystals, Piezoelectric - Research 2. Radio frequencies - Research 3. Crystals, Quartz - Synthetic.

For 1st - 7th, 9th - 10th reports see PB 101636-PB 101644, PB 101646-PB 101647s.

PIEZOELECTRIC INVESTIGATIONS. NINTH SEMI-ANNUAL TECHNICAL REPORT ON CONTRACT NO. W28-003-SC-1556 TO U. S. ARMY SIGNAL CORPS, BY KARL S. VAN DYKE, NOV 3-DEC 31, 1949. Wesleyan University. Scott Laboratory of Physics, Middletown, Conn. Jan 1950. 76p diagrs, tables Mi $3.50, Ph $10.00. PB 101646

1. Crystals, Piezoelectric - Research 2. Radio frequencies - Research.

For Vols. I-II and 2nd ed. (Parts I-II) see PB 101641, PB 101643, PB 101647 and PB 101647s. For 1st - 8th, 10th reports see PB 101636 - PB 101645, PB 101647 - PB 101647s. Dept. of the Army project 3-99-11022. Signal Corps project: 142B. Placed by U. S. Army, Signal Corps Engineering Laboratory, Fort Monmouth, Red Bank, N. Y. Contents: Part II. Manual of piezoelectric data, by Karl S. Van Dyke, Vol. III. p. 11-78.

PIEZOELECTRIC INVESTIGATIONS. TENTH REPORT ON CONTRACT NO. W28-003-SC-1556 TO U. S. ARMY SIGNAL CORPS, BY KARL S. VAN DYKE, JAN 1- MAR 31, 1950. WESLEYAN UNIVERSITY. SCOTT LABORATORY OF PHYSICS, MIDDLE-

TOWN, CONN. SUPPLEMENTARY VOLUME. Mar 1950. 34p tables Mi $2.25, Ph $5.00. PB 101647s

1. Crystals, Piezoelectric - Research 2. Radio frequencies - Research.

For pt. I see PB 101647. For 1st - 10th reports see PB 101636 - PB 101647. Dept. of the Army project 3-99-11022. Signal Corps project 142B. Placed by U.S. Army Signal Corps Engineering Laboratory, Fort Monmouth Red Bank, N. J. Contents: Manual of piezoelectric data, by Karl S. Van Dyke and G. D. Gordon. 2nd ed. Supplementary volume. (Part II) 33p. For Vols I-III and 2nd ed (Part I) see PB 101641, PB 101643, PB 101646 and PB 101647.

Miscellaneous

CW ATTENUATION AND PHASE MEASUREMENTS OF COAXIAL TRANSMISSION LINES, by L. L. Cazenavette. U. S. Naval Research Laboratory. Jun 1950. 15p diagrs, graphs, tables Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $.50. PB 101655

The problem of measuring the attenuation of low-loss transmission lines between 10 and 300 megacycles has been investigated, and there has been adopted a method of measurement which reduces the measurement of attenuation to the linear measurement of the distance between two points on a slotted line. For low values of attenuation, the slotted line need not be more than a small fraction of a wavelength long. Experimental data obtained from a test cable indicates that the attenuation varies at low frequencies according to the equation $\alpha = (4.152 + 0.024)10^{-2} \sqrt{f}$ where α is expressed in db/100 feet and f in Mc. The velocity of phase propagation through the test cable was measured at approximately 50, 80, and 200 Mc; no significant variation was observed. NRL R 3677.

DESIGN AND USE OF SATURABLE REACTORS FOR VARIOUS PURPOSES, by M. Zühlke. British Electrical and Allied Industries Research Association, London. Jun 1948. 17f drawings, graphs Mi $1.75, Enl Pr $3.75. PB 101404

1. Reactors, Saturable-core - Design - Germany 2. Reactors, Saturable-core - Uses - Germany.

Technical report G/T210, B/TK573.

GERMAN SWITCHGEAR PRACTICE; REPLIES TO QUESTIONAIRE SUBMITTED TO GERMAN EXPERTS. GERMAN TECHNIQUE IN E.H.T. SWITCHING STATIONS, WITH SPECIAL REFERENCE TO METHODS OF EARTHING, INSULATION LEVELS AND PROTECTION, by G. Meiners. British Electrical and Allied Industries Research Association, London. 1947. 70f drawings, tables Mi $3.00, Enl Pr $10.00. PB 101403

1. Switch gear - Germany 2. Micro BIOS ERA 205 3. Micro BIOS ERA 211.

HOCHFREQUENZ-ABSCHIRMWIRKUNG UND DAUERBIEGE FESTIGKEIT VON VERSCHIEDENEN ELEKTRISCHEN LEITUNGSARTEN (EFFECT OF HIGH-FREQUENCY SCREENING AND THE BENDING STRENGTH OF VARIOUS TYPES OF ELECTRIC CONDUCTORS), by H. Viehmann. Germany. Zentrale für Wissenschaftliches Berichtswesen der Luftfahrtforschung. Aug 1936. 22f diagrs, graphs, tables (Text in German) Mi $2.00, Enl Pr $5.00. PB 101286

1. Conductors - Tests - Germany 2. ZWB FB 187/4 3. Micro BIOS FD 943/49, Frames 1-22.

Abstract available as PB 101286s. 1p. Mi $1.25, Ph $1.25.

FOOD AND KINDRED PRODUCTS

BROWNING REACTION, BY CHARLES D. HURD, L. ROSNATI AND C. BUESS, JUL 1, 1949 - JUN 30, 1950. U. S. Quartermaster Food and Container Institute. Jun 1950. 6p Mi $1.25, Ph $1.25. PB 101828

The report takes up the purification of tetrahydropyran-2,3-diol and describes several extensions of the aldol condensation which are thought to be involved in the browning reaction. Acetol and phenacyl alcohol (CH_3COCH_2OH, $C_6H_5COCH_2OH$) may be regarded as model ketose molecules and these have been used in the condensations, especially with benzaldehyde and acetaldehyde. Reactions of a complex nature appear to take place which at present are imperfectly understood but work on their elucidation is in progress. QMC FCI Contract W11-183-qm-8144 Rept. 13.

CAUSES AND PREVENTION OF OFF-FLAVOR DEVELOPMENT IN FATTY FOODS, BY F. W. QUACKENBUSH AND OTHERS. JUL 1, 1945 - DEC 31, 1948. U. S. Quartermaster Food and Container Institute. Dec 1948. 87p graphs, tables Mi $3.75, Ph $11.25. PB 101829

The scope of this work includes laboratory studies on the fundamental changes which occur during autoxidation of fats and means of effecting greater stability of edible fats for use by our armed forces. QMC FCI Contract W11-183-qm-1871 Rept. 6.

DIET AND TISSUE RESERVE. EFFECTS OF A REDUCTION IN CALORIC INTAKE UPON NITROGEN RETENTION, BY JAMES B. ALLISON AND HAROLD L. ROSENTHAL, JUL 1, 1949 TO JUN 30, 1950. U. S. Quartermaster Food and Container Institute. Jun 1950. 15p graphs, tables Mi $1.75, Ph $2.50. PB 101822

Two successive responses to restricted caloric intakes are recognized in dogs. The first response is a relatively small increase in the excretion of nitrogen without changing the nitrogen balance index of the dietary protein. The second response is an increase in the excretion of both body and dietary nitrogen, the nitrogen balance index of the dietary protein being reduced. AAF TR 5928.

DRAWINGS, DIAGRAMS AND LEAFLETS RELATING TO FOOD PROCESSING MACHINERY. "Miag" Muhlenbau und Industrie A. G., Braunschweig, Ger. 1930-1946. 288f drawings (Text in German and English) Mi $9.00, Enl Pr $38.75. PB 101690

1. Food machinery - Germany 2. Micro BIOS FD 1755/46, Frames 1-81. Abstract available as PB 101690s. 2p. Mi $1.25, Ph $1.25.

FAT DETERIORATION IN WHEAT FLOUR AND PREPARED MIXES IN RELATION TO THEIR PERFORMANCE VALUE, BY W. F. GEDDES, N. CEAGLSKE AND S. M. BARER, JUL 1, 1949 TO JUN 30, 1950. U. S. Quartermaster Food and Container Institute. Jun 1950. 2p Mi $1.25, Ph $1.25. PB 101824

1. Flour, Wheat - Fat deterioration 2. Fats - Deterioration 3. Minnesota. University. Division of Agricultural Biochemistry 4. QMC FCI Contract DA11-183-qm-310 Rept. 10.

NUTRITIVE VALUE OF ARMY RATIONS, BY C. A. ELVEHJEM, U. D. REGISTER, U. J. LEWIS AND D. V. TAPPAN, 1 JUL 1949 - 30 JUN 1950. U. S. Quartermaster

Food and Container Institute. Jun 1950. 3p Mi $1.25, Ph $1.25. PB 101823
1. Food rations - Nutritive value 2. Wisconsin. University. Department of Biochemistry 3. QMC FCI Contract W11-183-qm-8124 Rept. 22.

ROLE OF PECTIN IN DEHYDRATED FOODS, BY GEORGE L. BAKER, AND W. GAIL MURRAY, 30 SEP 1948 - 30 JUN 1949. U. S. Quartermaster Food and Container Institute. Jun 1949. 3p Mi $1.25, Ph $1.25. PB 101825
The stated objective is to determine the role of pectin as related to dehydration and rehydration of synthetic preparations simulating fruit products and then to adapt these fundamental findings to fruit and vegetable products. However, the main objective is to improve rehydration properties and the overall quality of dehydrated fruits and vegetable products. QMC FCI Contract W11-183-qm-5481, Rept. 8.

SPECIAL TURBO-KILN FOR THE HOT SMOKING OF FISH. Büttner-Werke A. G., Uerdingen, Ger. 1945. 204f drawings (Text in German) Mi $7.50, Enl Pr $27.50. PB 101275
1. Fish - Processing machines - Germany 2. Kilns, Turbo - Germany 3. Micro BIOS FD 5357/47, Frames 1-36+125.
Abstract available as PB 101275s. 1p. Mi $1.25, Ph $1.25.

STUDY OF SOME CHEMICAL FACTORS INVOLVED IN THE BROWNING OF CERTAIN FOOD CONSTITUENTS, BY C. D. BALL, JOHN C. SPECK, JR. AND ARLINGTON FLORIST, JUL 1, 1949 - JUN 30, 1950. U. S. Quartermaster Food and Container Institute. Jun 1950. 11p table Mi $1.75, Ph $2.50. PB 101827
1. Food - Analysis - Browning 2. Michigan State College of Agriculture and Applied Science. Department of Chemistry, East Lansing, Mich. 3. QMC FCI Contract W11-183-qm-8125 Rept. 14.

STUDY OF THE PHYSICAL AND CHEMICAL CHANGES OCCURRING IN BREAD DURING STORAGE, BY W. F. GEDDES AND OTHERS, JUL 1, 1949 TO JUN 30, 1950. U. S. Quartermaster Food and Container Institute. Jun 1950. 6p Mi $1.25, Ph $1.25. PB 101826
Investigations relating to the staling and browning of bread have been conducted along the following lines: 1. Effects of certain emulsifying agents on the firmness and rate of change in firmness of bread crumb. 2. Miscellaneous staling studies with starch pastes. 3. Effect of flour strength on the rate of staling of bread. 4. The nature of the "soluble starch" fraction of bread crumb and its significance in bread staling. 5. Studies on the browning reaction in bread. QMC FCI Contract DA11-183-qm-20 Rept. 14.

FUELS AND LUBRICANTS

BIBLIOGRAPHY ON OFFSHORE PETROLEUM DEVELOPMENTS, BY Emory N. Kemler. Southwest Research Institute. Division of Oceanography and Meteorology, San Antonio, Texas. n.d. 18p Available from Southwest Research Institute, P. O. Box 2296, San Antonio 6, Texas. PB 101481
This bibliography summarizes the literature available on deep water operations in connection with petroleum production. It includes material which has been published relative to operations in the Gulf of Mexico, Lake Maracaibo, off the California Coast and other marine areas. Publication 1.

BROWN COAL AND GASIFICATION ANALYSES. Braunkohlen- und Grosskraftwerk, Böhlen, Ger. 1942-1945. 8f diagr (Text in German) Mi $1.25, Enl Pr $2.50. PB 101351

1. Lignite - Gasification - Germany 2. Micro BIOS FD 3185/46, Frames 1-8.
Abstract available as PB 101351s. 1p. Mi $1.25, Ph $1.25.

COAL FIELDS OF WESTERN HONSHU, JAPAN, by Robert D. MacAfee. Supreme Commander of the Allied Powers. Natural Resources Section. Jul 1950. 56p photos, diagrs, maps, tables Mi $2.75, Ph $7.50. PB 101485

This report presents information on mining methods, coal reserves, geology, productive capacities, and future prospects of the two principal coal fields located in western Honshu. The Ube coal field produces chiefly bituminous coal, with a minor production of anthracite in one small area. The Omine field produces only anthracite coal. SCAP NRS 132.

COMPARATIVE TABLE OF VARIOUS PRODUCTION PROCESSES OF SYNTHESIS-GAS (HYDROGENATION). Lurgi Gesellschaft für Warmetechnik m.b.H., Frankfort, Ger. 1942. 8f table (Text in German) Mi $1.25, Enl Pr $2.50. PB 101353

1. Gas - Synthesis - Germany 2. Micro BIOS FD 1801/47, Frame 1.
Abstract available as PB 101353s. 2p. Mi $1.25, Ph $1.25.

CONSTANT-PRESSURE COMBUSTION CHARTS INCLUDING EFFECTS OF DILUENT ADDITION, by L. Richard Turner and Donald Bogart. U. S. National Advisory Committee for Aeronautics. 1949. 27p graphs Available from Supt. of Documents, U.S. Government Printing Office, Washington 25, D. C. $.25. PB 101364

Charts are presented for the calculation of (a) the final temperatures and the temperature changes involved in constant-pressure combustion processes of air and in products of combustion of air and hydrocarbon fuels, and (b) the quantity of hydrocarbon fuel required in order to attain a specified combustion temperature when water, alcohol, water-alcohol mixtures, liquid ammonia, liquid carbon dioxide, liquid nitrogen, liquid oxygen, or their mixtures are added to air as diluents or refrigerants. NACA 937.

DESCRIPTION OF THE HIGH-PRESSURE BROWN COAL GAS GENERATION PLANT. Braunkohle-Benzin A. G., Böhlen, Ger. 1942. 4f (Text in German) Mi $1.25, Enl Pr $1.50. PB 101350

1. Lignite - Gasification - Germany 2. Micro BIOS FD 3184/46, Frames 1-4.
Abstract available as PB 101350s. 1p. Mi $1.25, Ph $1.25. Drawing of the plant is not included.

DIRECTIONS FOR THE TESTING OF AVIATION SPIRITS. Germany. Reichsluftfahrtministerium. Apr 1943. 9f (Text in German) Mi $1.25, Enl Pr $2.50. PB 101592

1. Fuels, Aviation - Tests - Germany 2. Micro BIOS FD 2876/46, Item 32, Frames 1-9.
Abstract available as PB 101592s. 1p. Mi $1.25, Ph $1.25.

EFFECT OF THE CONSTRUCTION OF COMBUSTION ENGINES AND OF OPERATING CONDITIONS ON THE KNOCK BEHAVIOR OF FUELS, by H. H. Berg. Deutsche Versuchsanstalt für Luftfahrt, E. V. Institut für Betriebstofforschung, Berlin. 1939. 100f photos, diagrs, drawings, graphs, tables (Text in German and English) Mi $4.25, Enl Pr $13.75. PB 101590

1. Fuels, Aviation - Knocking - Germany 2. Micro TOM 225, Items 46-48 3. Micro BIOS FD 2876/46, Items 46-48, Frames 1-94.
Abstract available as PB 101590s. 2p. Mi $1.25, Ph $1.25.

EIGENSCHAFTEN VON SICHERHEITSKRAFTSTOFFEN (PROPERTIES OF SAFETY FUELS), by Mayer-Burgström and Seeber. Deutsche Versuchsanstalt für Luftfahrt E. V. Institut für Betriebstofforschung. Jun 1939. 50f drawings, graphs, tables (Text in German and English) Mi $2.50, Enl Pr $7.50. PB 101274
1. Fuels, Aviation - Tests - Germany 2. ZWB FB 1074 3. Micro BIOS FD 2876/46, Item 64, Frames 1-46.
Abstract available as PB 101274s. 2p. Mi $1.25, Ph $1.25.

EIGENSCHAPPEN VAN CONSISTENTE VETTEN ALS FUNCTIE VAN RECEPT EN BEREIDINGSWIJZE (PROPERTIES OF SOLID GREASES IN RELATION TO THEIR COMPOSITION AND METHOD OF PREPARATION), by H. Van Olphen and J. Vos. N.V. De Bataafsche Petroleum Maatschappij, Amsterdam. Mar 1942. 27f photos, graphs, tables (Text in Dutch) Mi $2.00, Enl Pr $5.00. PB 101601
1. Greases - Manufacture - Holland 2. Greases - Physical properties - Holland 3. Greases - Chemical analysis - Holland 4. Greases - Water content - Holland 5. CIOS XXXII-94 LD 6. Micro BIOS FD 2875/46, Item no. 3, Frames 3099-3121.
Listed in CIOS XXXII-94, p. 35. Report 8665-IIIA. Abstract available as PB 101601s. 2p. Mi $1.25, Ph $1.25.

ESTIMATED AND ACTUAL COSTS OF CONSTRUCTION, LURGI HP GAS PLANT, BOHLEN. Braunkohlen Benzin A. G., Böhlen, Ger. n.d. 8f (Text in German) Mi $1.25, Enl Pr $2.50. PB 101304
1. Gas - Manufacture - Germany 2. Micro BIOS FD 109/47, Frames 1-8.
Will not reproduce well.

ETHYLENE OXIDE PLANT: EXTENSION AND IMPROVEMENT OF PLANT. I. G. Farbenindustrie A. G., Schkopau, Ger. 1939-1944. 96f drawings, tables (Text in German) Mi $4.25, Enl Pr $13.75. PB 101600
1. Ethylene oxide - Production - Germany 2. Micro BIOS FD 2620/47, Frames 1-96.
Abstract available as PB 101600s. 2p. Mi $1.25, Ph $1.25.

EXAMINATION OF DIESEL FUEL IN AN AERO-ENGINE. Germany. Zentrale für Wissenschaftliches Berichtwesen über Luftfahrtforschung. 1936. 13f tables (Text in German) Mi $1.75, Enl Pr $3.75. PB 101585
1. Fuels, Aviation - Tests - Germany 2. Micro BIOS FD 2876/46, Item 91, Frames 120-132 3. Micro TOM 225.
Abstract available as PB 101585s. 2p. Mi $1.25, Ph $1.25.

GERMAN PROJECTS FOR THE ERECTION OUTSIDE GERMANY OF PLANTS OPERATING THE FISCHER SYNTHESIS AND KINDRED PROCESSES. Ruhrchemie A. G., Oberhausen-Holten, Ger. 1938-1944. 355f drawings (Text in German) Mi $9.00, Enl Pr $47.50. PB 101519
1. Fischer-Tropsch process - Germany 2. Oils, Diesel - Production - Germany 3. Exhaust gases - Conversion - Germany 4. Hydrocarbons - Synthesis - Germany 5. Paraffin wax - Synthesis - Germany 6. Micro BIOS FD 5611/47, Frames 1-246+ 81.
Abstract available as PB 101519s. 2p. Mi $1.25, Ph $1.25.

IMPROVING THE REACTION MECHANISM OF THE FISCHER-TROPSCH SYNTHESIS. Ruhrchemie A. G., Oberhausen, Ger. 1937-1944. 55f diagr, graphs (Text in German) Mi $2.75, Enl Pr $8.75. PB 101282
1. Fischer-Tropsch process - Germany 2. Hydrocarbons - Synthesis - Germany 3. Micro BIOS FD 5434/47, Frames 1-55.
Abstract available as PB 101282s. 1p. Mi $1.25, Ph $1.25.

KLOPFMESSUNG MIT DEM DVL-VERFAHREN DER DRUCKBESCHLEUNIGUNG (KNOCK MEASURING BY THE DVL METHOD OF PRESSURE ACCELERATION), by F. Seeber and F. Lichtenberger. Deutsche Versuchsanstalt für Luftfahrt E. V., Berlin. Dec 1939. 46f photos, graphs, tables (Text in German) Mi $2.50, Enl Pr $7.50. PB 101529
1. Fuels, Aviation - Knocking - Germany 2. ZWB FB 1150 3. Micro BIOS FD 2869/46, Item 28, Frames 6239-6269.
Abstract available as PB 101529s. 1p. Mi $1.25, Ph $1.25.

ÖLPRÜFUNGS-RINGVERSUCHE IM AUFTRAG DER DVL (OIL TESTING-RING EXPERIMENTS), by Heidebrook. Dresden. Technische Hochschule. Jan 1945. 73f diagrs, drawings, graphs, tables (Text in German and English) Mi $3.50, Enl Pr $11.25. PB 101586
1. Lubricating oils - Tests - Germany 2. Micro BIOS FD 2876/46, Item 53, Frames 1-52+20.
Forschungsbericht no. 300. English translation included. Abstract available as PB 101586s. 1p. Mi $1.25, Ph $1.25.

PRÜFUNG DER SCHMIERFÄHIGKEIT VON ÖLEN AUF DEN ÖLPRÜFMASCHINEN VON ALMEN, WIELAND UND THOMA (TESTS OF LUBRICATING ABILITY OF OILS ON THE OIL TESTING MACHINE OF ALMEN, WIELAND & THOMAS), by Mayer-Bugström. Mar 1938. 16f graphs, tables (Text in German) Mi $1.75, Enl Pr $3.75. PB 101589
1. Lubricating oils - Tests - Germany 2. ZWB UM 520 3. Micro BIOS FD 2876/46, Item 49, Frames 1-17.

PRÜFUNG VERSCHIEDENER ALKYL-BENZOLE IM HEISSGEKÜHLTEN FLUGMOTOREN-EINZYLINDER (TEST OF VARIOUS ALKYLBENZINES IN A LIQUID COOLED SINGLE-CYLINDER AERO-ENGINE), by W. Glaser and K. Dehn. Germany. Zentrale für Wissenschaftliches Berichtswesen über Luftfahrtforschung. 1937. 22f graphs, tables (Text in German) Mi $2.00, Enl Pr $5.00. PB 101587
1. Fuels, Aviation - Tests - Germany 2. ZWB UM 428 3. Micro BIOS FD 2876/46, Item 52, Frames 1-19.
Abstract available as PB 101587s. 2p. Mi $1.25, Ph $1.25.

PURIFICATION OF SYNTHESIS GAS. FINE PURIFICATION MASS. IRON CATALYSTS, DESULPHURIZATION, ETC. Ruhrchemie A. G., Oberhausen-Holten, Ger. 1935-1945. 85f diagr, drawings, tables (Text in German) Mi $3.75, Enl Pr $12.50. PB 101284
1. Gas - Synthesis - Germany 2. Gas - Purification - Germany 3. Iron - Catalysts - Germany 4. Micro BIOS FD 5613/47, Frames 1-84.
Abstract available as PB 101284s. 3p. Mi $1.25, Ph $1.25.

SCHMIERSTOFFPRÜFUNG IM BMW-132F-EINZYLINDER-MOTOR (LUBE TESTING IN THE BMW 132-F-SINGLE CYLINDER ENGINE) (ZWB UM 574). ENTWICKLING

EINES BETRIEBSTOFF-DAUERPRÜF VERFAHRENS IM NSU MOTOR (DEVELOPMENT OF A LUBE-FUEL-MIXTURE PERFORMANCE TEST IN THE NSU ENGINE) (ZWB UM 573). VERBESSERUNG UND VEREINFACHUNG DER SCHMIERSTOFFPRÜFUNG IM BMW-132-FLUGMOTOREN-EINZYLINDER. (IMPROVEMENT AND SIMPLICATION OF LUBE TESTING IN THE BMW-132-F SINGLE CYLINDER ENGINE) (ZWB UM 546). VERSUCHE MIT DER IN DER DVL ENTWICKELTEN ÖLPRÜFMASCHINE (TESTS WITH THE DVL OIL TEST ENGINE) (ZWB UM 485), by H. Schökel. Deutsche Versuchsanstalt für Luftfahrt, E. V., Berlin. Institut für Betriebstofforschung. Nov 1937-Aug 1938. 66f photos, graphs, tables (Text in German) Mi $3.00, Enl Pr $10.00. PB 101569

1. Lubricating oils - Tests - Germany 2. ZWB UM 574 3. ZWB UM 573 4. ZWB UM 546 5. ZWB UM 485 6. Micro BIOS FD 2876/46, Items 42-44, Frames 1-63. 7. Micro TOM 225, Frames 193-200.

Translation of ZWB UM 573 is PB 38051. ZWB UM 485 is also PB 38616.

STRUCTURAL GUIDES FOR SYNTHETIC LUBRICANT DEVELOPMENT, by C. M. Murphy and W. A. Zisman. U. S. Naval Research Laboratory. Apr 1950. 20p graphs, tables Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. Mimeo: $.50. PB 101495

General structural guides for the development of synthetic lubricant fluids are presented. To attain small temperature coefficients of viscosity, flexible long-chain structures with small cross-sectional areas are required. It is better to synthesize the oil to have the optimum bulk properties and to care for the surface chemical properties by additional agents. The properties of hydrocarbons; ethers; polyethers; thioethers; mono-, di-, tri-, and tetraesters; silicones; perhalocarbons; and amides are discussed in relation to these guides. Interim report. NRL R3667.

TEST INSTRUCTIONS FOR AERO-ENGINE LUBRICANTS IN OTTO ENGINES AND FOR AERO-ENGINE FUELS. Germany. Reichsluftfahrtministerium. 1938-1940. 110f photos, drawings, graphs, tables (Text in German) Mi $4.50, Enl Pr $15.00. PB 101594

1. Fuels, Aviation - Tests - Germany 2. Lubricating oils - Tests - Germany 3. Micro BIOS FD 2876/46, Items 26-27, Frames 1-106.

Abstract available as PB 101594s. 2p. Mi $1.25, Ph $1.25.

ÜBER DIE KONSTITUTION UND EIGENSCHAFTEN VON SCHMIERÖLEN UND ÜBER IHRE VERANDERUNG DURCH OXIDATION (CONSTITUTION AND PROPERTIES OF LUBRICATING OILS AND THEIR CHANGES BY OXIDATION), by O. Selter. Deutsche Versuchsanstalt für Luftfahrt E. V. Institut für Betriebsforschung, Berlin. Mar 1938. 40f graphs, tables (Text in German and English) Mi $2.25, Enl Pr $6.25. PB 101588

1. Lubricating oils - Properties - Germany 2. Lubricating oils - Oxidation - Germany 3. Lubricating oils - Stability - Germany 4. ZWB UM 518 5. Micro BIOS FD 2876/46, Item 50, Frames 1-16+23 6. Micro TOM 225.

English abstract available as PB 101588s. 1p. Mi $1.25, Ph $1.25.

UNTERSCHIEDLICHES KLOPFVERHALTEN VON KRAFTSTOFFEN VERSCHIEDENEN CHEMISCHE AUFBAUES IN DEN MOTOREN BMW 132N UND DB 601E (DIFFERENT KNOCK BEHAVIOR OF FUELS OF DIFFERENT CHEMICAL STRUCTURE IN THE ENGINES BMW 132N AND DB601E), by Franke. Deutsche Versuchsanstalt für Luft-

fahrt E. V. Institut für Betriebsforschung, Berlin. Jul 1944. 48f tables (Text in German and English) Mi $2.50, Enl Pr $7.50. PB 101584
1. Fuels, Aviation - Knocking - Germany 2. BMW 132N (Engine) 3. DB 601E (Engine) 4. ZWB FB 1869 5. Micro BIOS FD 2876/46, Item 89, Frames 1-33+14.
Contains English translation.

UNTERSUCHUNG VON SECHS KRAFTSTOFFEN NACH DEM OPPAUER- UND DEM DVL-ÜBERLÄDEPRÜFVERFAHREN (TESTING OF SIX TYPES OF FUELS ACCORDING TO THE OPPAU AND THE DVL SUPERCHARGE TEST METHODS), by F. Seeber. Deutsche Versuchsanstalt für Luftfahrt E. V. Institut für Betriebstofforschung. Dec 1941. 15f graphs, tables (Text in German) Mi $1.75, Enl Pr $3.75. PB 101732
1. Fuels, Aviation - Tests - Germany 2. Fuels, Aviation - Testing equipment - Germany 3. BMW 132 (Engine) 4. Micro BIOS FD 2876/46, Item 41, Frames 1-15.
Abstract available as PB 101732s. 1p. Mi $1.25, Ph $1.25.

VERHALTEN VON KRAFTSTOFFEN IN S.G.-BEHÄLTERN (BEHAVIOR OF FUELS IN S. G. CONTAINERS), by F. Seeber and I. Morghen. Deutsche Versuchsanstalt für Luftfahrt E. V. Institut für Betriebstofforschung. Sep 1942. 13f photos, diagrs, graphs, tables (Text in German) Mi $1.75, Enl Pr $3.75. PB 101731
1. Fuel - Storage - Tests - Germany 2. Tanks, Fuel - Tests - Germany 3. Micro BIOS FD 2876/46, Item 38, Frames 1-11.
Abstract available as PB 101731s. 1p. Mi $1.25, Ph $1.25.

VERSUCHE AN EINEM VIERKUGEL- ÖLPRÜFGERAT (TESTS ON A FOUR-BALL OIL TESTING APPARATUS), by C. F. Krienke. Deutsche Versuchsanstalt für Luftfahrt E. V. Institut für Betriebstofforschung. Mar 1943. 18f photos, drawings, graphs, (Text in German) Mi $1.75, Enl Pr $3.75. PB 101729
1. Oils - Testing equipment - Germany 2. Micro BIOS FD 2876/46, Item 35, Frames 1-18.

VERZEICHNIS DER BERICHTE HOLLÄNDISCHE SYNTHESEÖLBERICHTE (LIST OF DUTCH SYNTHESIS-OIL REPORTS). Rhenania-Ossag Mineralölwerke A. G., Hamburg, Ger. n.d. 2f (Text in German) Mi $1.25, Enl Pr $1.25. PB 101595
1. Oils, Synthetic - Bibliography 2. Micro BIOS FD 2876/46, Item 25, Frames 1-2.

INSTRUMENTS

DEVICE FOR COMPUTING CORRELATION FUNCTIONS, by A. E. Hastings and J. E. Meade. U. S. Naval Research Laboratory. Jun 1950. 8p graphs, tables Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $.25. PB 101656
An analogue device has been constructed for computing auto-correlation functions. On reproducing a function recorded on two channels of a magnetic tape, the spacing of two pick-ups can be varied to obtain the function, delayed in one relative to that in the other. An electrodynamometer wattmeter indicates the average product of the two functions for any value of delay, determining the autocorrelation function. Cross-correlation of two different functions can also be calculated. Autocorrelation functions and their transforms, the power spectra, are obtained for several types of functions. A comparison of this method of obtaining power spectra with that using an ordinary Fourier analysis indicates that the latter is preferable for the particular conditions outlined. NRL R 3679.

DIGITAL COMPUTERS AS INFORMATION-PROCESSING SYSTEMS, by Jay W. Forrester. Massachusetts Institute of Technology. Servomechanisms Laboratory. Jun 1949. 29p drawings, tables Mi $2.00, Ph $3.75. PB 101751

Digital computers to be used as information-processing systems represent a new branch of communications engineering and a future extension of the concept of servomechanisms and automatic control. This discussion is presented in four parts: 1. Illustrations of information-processing systems. 2. A general description of a digital computer. 3. A few elementary principles of computer operation. 4. The coding or instructing of an automatic computer in a few simple processes. Project Whirlwind. Project DIC 6345. Contract N5ori-60. Project NR-048-097. MIT SL R-166.

INVESTIGATIONS OF THE MEASUREMENT OF NOISE. PROGRESS REPORT NO. 12, NOV 1, 1948 TO MAR 30, 1949, by Conrad J. Fowler and Ralph M. Showers. Pennsylvania. University. Moore School of Electrical Engineering and U. S. Bureau of Ships. Apr 1949. 22p diagrs, graphs Mi $2.00, Ph $3.75. PB 110116

1. Noise - Measurements 2. Meters, Sound.

Contract NObsr 39269. For progress reports 1-8, 9-10, 13-15 see PB 85974-PB 85981, PB 110114-PB 110115, PB 110117, PB 110119.

INVESTIGATIONS OF THE MEASUREMENT OF NOISE. PROGRESS REPORT NO. 16, JAN 1, 1950 TO MAR 30, 1950, by Conrad J. Fowler and Francis T. Nicholson. Pennsylvania. University. Moore School of Electrical Engineering and U. S. Bureau of Ships. Apr 1950. 82p diagrs, graphs, tables Mi $3.75, Ph $11.25. PB 101545

1. Noise - Measurements 2. Meters, Sound.

Research division report 50-25. Contract NObsr 39269. For progress reports 1-10, 12-15 see PB 85974-PB 85981, PB 110114-PB 110119.

INVESTIGATIONS OF THE MEASUREMENT OF NOISE. PROGRESS REPORT NO. 17, APR 1, 1950 TO JUN 30, 1950, by Conrad J. Fowler and Francis T. Nicholson. Pennsylvania. University. Moore School of Electrical Engineering and U. S. Bureau of Ships. Jul 1950. 28p diagrs, graphs, tables Mi $2.00, Ph $3.75. PB 101546

1. Noise - Measurements 2. Meters, Sound.

Research division report 51-3. Contract NObsr 36269. For progress reports 1-10, 12-16 see PB 85974-PB 85981, PB 110114-110119, PB 101545.

LEADING AND COUPLING EFFECTS OF STANDING-WAVE DETECTORS, by K. Tomiyasu. Harvard University. Cruft Laboratory. May 1949. 17p diagr, graphs Mi $1.75, Ph $2.50. PB 101669

When measuring impedances on transmission lines, insensitive standing-wave detectors have the effect of yielding lower standing-wave ratios than the true values. Double-hump distribution curves are shown to be the result of very tight coupling of the detector. Detectors that can be represented by a susceptance component may indicate unsymmetrical distribution curves. Sensitive detectors used on transmission lines having low power levels can introduce tight coupling effects. Conditions are given for a loosely coupled detector. Research reported in this document was made possible through support extended Cruft Laboratory, Harvard University, jointly by the Navy Department (Office of Naval Research), the Signal Corps of the U. S. Army, and the U. S. Air Force, under ONR contract N5-ori-76, Task order no. 1. NR-078-011. HU CL TR 81.

MEASUREMENT OF MECHANICAL ACTIONS BY ELECTRICAL-RESISTANCE METHODS, by P. B. Walker. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Jun 1946. 8p tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.50. PB 101778

The possibilities for exploiting the principle that mechanical action may produce measurable changes in electrical resistance are reviewed in a general way, and lines of development and research are suggested. Consideration is given to extending the principle of the strain gauge to measurement of force and acceleration. Cover date is 1950. S.O. Code no. 23-2388. ARC RM 2388.

TEMPERATURE RECORDING WITH THERMISTORS, by P. A. Seay and W. E. Gordon. Texas. University. Electrical Engineering Research Laboratory. Jun 1948. 13p diagrs, graph, tables Mi $1.75, Ph $2.50. PB 101667

This report describes a device for automatically recording temperature on a linear scale. Thermistors, commercially available temperature sensitive ceramic resistors, are compensated to match a single temperature resistance curve. The amplifier-recorder linearizes the system to produce a single convenient chart scale to which a large number of thermistors have been fitted. The usual drift problems associated with direct current amplifiers have been eliminated by the use of an automatic zero reset system. The apparatus described records temperatures with a tolerance of about 0.1C in as many as 12 locations per minute on one recording meter for any of four 25C ranges. Automatic switching permits continuous or a predetermined schedule of unattended operation. Work sponsored by Office of Naval Research (Geophysical Branch), Contract N6onr-266, Task order 2. TU EERL 16.

LEATHER AND LEATHER PRODUCTS

DETERMINATION OF COLD RESISTANCE OF ARTIFICIAL LEATHER, by Dr. Lehmann. I. G. Farbenindustrie A. G., Schkopau, Ger. Apr 1943. 5f photos, graphs, (Text in German) Mi $1.25, Enl Pr $1.50. PB 101288

1. Leather, Synthetic - Cold resistance - Germany 2. Micro BIOS FD 2356/47, Frames 1-5.

Abstract available as PB 101288s. 1p. Mi $1.25, Ph $1.25.

LUMBER AND WOOD PRODUCTS

FORESTRY AND FLOOD CONTROL IN JAPAN, by C. J. Kraebel. Supreme Commander for the Allied Powers. Natural Resources Section. Jul 1950. 30p photos, graphs, tables Mi $2.00, Ph $3.75. PB 101509

In recognition of the seriousness of the flood and erosion damage to Japan, SCAP invited Mr. C. J. Kraebel, and International Watershed Management Specialist, to investigate the extent of the influence of forests on flood control in Japan. This report not only summarizes the important actions needed in watershed plans and upstream improvement, but also emphasizes the coordination acquired among various Government agencies. SCAP NRS PS 39.

JAPANESE FORESTRY BIBLIOGRAPHY, 1940-48, by Thomas Sasaki and Kazuo Watanabe. Supreme Commander for the Allied Powers. Natural Resources Section. Aug 1950. 134p Mi $5.50, Ph $17.50. PB 101681
1. Forests and forestry - Bibliography - Japan 2. SCAP NRS PS 40.

MOISTURE ABSORPTION IN CERTAIN TROPICAL AMERICAN WOODS, by Thomas E. Batey, Jr. and Frederick F. Wangaard. Yale University. School of Forestry. Aug 1949. 26p diagrs, graphs, tables Mi $2.00, Ph $3.75. PB 101650
The rate of moisture absorption and the distribution pattern of the moisture absorbed were determined by specimens of 25 tropical American woods submerged in salt H_2O. This study is a part of a general evaluation of these woods. For each species, half of the total number of specimens were coated with hot paraffin to eliminate, or at least minimize, the effects of end penetration and thus to afford a better estimate of the relative absorption characteristics of lumber in service in which side-grain penetration predominates. The remaining uncoated specimens permitted a comparison of the additional effect of uninhibited end penetration in short blocks of the same woods. Technical report no. 1. Project N6-ori-44, Task order XV. Project designation MR-033-020.

STUDIEN ÜBER AUSBEUTE UND DE REAKTIONSGESCHWINDIGKEIT BEI DER BILDUNG VON SCHWELFELLIGNIN AUS FICHTENHOLZ (INVESTIGATION OF YIELD AND REACTION TIME IN THE SULFIDIZATION OF SPRUCE WOOD), by Terje Enkvist, Mauri Moilanen, and Bo Alfredssen. 1949. 9p photos, graphs, tables (Text in German) Mi $1.25, Ph $1.25. PB 101497
An investigation of the sulfidization of spruce wood with hydrogen sulfide at 100°C showed that the yield of thiolignin does not increase through the use of large amounts of hydrogen sulfide in aqueous solution regardless of whether the wood is beaten in a colloid mill before the cook or treated with alkalies, acids or other reagents as zinc chloride, sodium sulfite and calcium thiocyanate. On the other hand, substantially better yields are obtained if the reaction time is prolonged or the temperature elevated. When cooking spruce wood at 170° with hydrogen sulfide dissolved in pyridin the lignin is dissolved to 90% in 17 hours, while simultaneously carbohydrates are dissolved in an amount of about 13% of the wood. When cooking spruce wood with solutions of hydrogen sulfide in water or 60% alcohol at various values of pH the yield of thiolignin increases for increasing alkalinity up to pH=8.5. Above this value of pH, the yield of thiolignin remains fairly constant. Microscopic investigation in ultraviolet light shows that the lignin from cooks of spruce wood with hydrogen sulfide at pH=7 and temperatures above 100°C melts and flows out in the lumina of the cells, in many cases finally filling them up completely. Summaries in English and Swedish. Reprint from Svensk papperstidning 52 (1949) nr 21, p. 517. Svenska Träforskningsinstitutet Träkemi och Pappersteknik. Meddelande 48.

MACHINERY

CARBON FORMATION IN GAS TURBINE COMBUSTION CHAMBERS, by E.S. Starkman and A. G. Cattaneo. Shell Development Co., Emeryville, Calif. Sep 1948. 22p photos, graphs, tables Mi $2.00, Ph $3.75. PB 101796
A small combustion chamber corresponding in size to a fuel flow rate of one gallon per hour was used to investigate gas turbine combustion problems separate from the

complexities of compressor and turbine. The apparatus was used initially to study the probable effects of fuel and operating factors on the carbon deposits found in combustion chamber liners. The carbon deposition tendencies of paraffinic, naphthenic and aromatic fuels were found to increase in the order named. For a given carbon to hydrogen ratio carbon deposits decrease as volatility increases. Report P-43.

THE COMPREX; DESCRIPTION AND THEORETICAL DISCUSSION OF A SPECIAL TYPE OF PRESSURE EXCHANGER, by Albrecht Hussmann. 1941. 69p diagrs Mi $3.00, Ph $8.75. PB 101688
1. Compressors - Design - Germany 2. Turbines, Gas - Design - Germany 3. Heat exchangers - Design - Germany 4. AAF TR 1189.

EINFLUSS DER BETRIEBSBEDINGUNGEN AUF DIE KOLBENTEMPERATUR (INFLUENCE OF OPERATING CONDITIONS ON THE PISTON TEMPERATURE), by W. Glaser. Deutsche Versuchsanstalt für Luftfahrt E. V., Institut für Betriebsforschung, Berlin. Feb 1943. 54f photos, graphs (Text in German) Mi $2.75, Enl Pr $8.75. PB 101581
1. Pistons - Temperature - Germany 2. ZWB FB 1679 3. Micro BIOS FD 2876/46, Item 84, Frames 1-47.

EXHAUST GAS TURBINES AND REACTION JETS, by K. Leist and E. Koernschild. Germany. Zentrale für Wissenschaftliches Berichtswesen der Luftfahrtforschung. May 1939. 41f graphs Mi $2.50, Enl Pr $7.50. PB 101530
1. Turbines, Exhaust - Germany 2. ZWB FB 1069 3. Micro GDC 10/214T 4. Micro BIOS FD 5336/47, Frames 1-40.
English abstract included.

LONGITUDINAL ANODIC-MECHANICAL SAW, by Kh. M. Sarbash. Jun 1950. 10p photo, drawing, graph, tables Mi $1.25, Ph $1.25. PB 101707
The anodic-mechanical process of cutting is well suited to the cutting of steels in the raw state and at the same time is the only method of cutting tempered steels and tough alloys. The cleanness of the face of the cut is so satisfactory that the ends of blocks of stamps or dies, for example, do not require additional finishing. The anodic-mechanical method permits cutting of any metals. Science Translation Service. Translation no. 381. Translated by Francis X. Prior. Edited by Prof. F. A. Raven. Translated from Stanki i Instrument, Vol. 20, no. 11, 1949, pp. 15-16. STS 90.

MAKING AN ELECTRIC KILN, by Laurance E. Webber. New Hampshire. University. Engineering Experiment Station, Durham, N. H. Revised. Aug 1948. 16p photos, drawings, tables Available from Director, Engineering Experiment Station University of New Hampshire, Durham, N. Y. $.25. PB 101708
1. Kilns, Electric - Construction.
Engineering publication no. 1.

MESSUNG DER KOLBENTEMPERATUR AM LAUFENDEN MOTOR (MEASUREMENT OF PISTON TEMPERATURE IN A RUNNING MOTOR), by W. Glaser. Deutsche Versuchsanstalt für Luftfahrt E. V. Institut für Betriebstofforschung. Oct 1942. 40f photos, diagrs, drawings, graphs (Text in German) Mi $2.25, Enl Pr $6.25. PB 101730

1. Pistons - Temperature - Germany 2. Micro BIOS FD 2876/46, Item 36, Frames 1-38.

SMALL ELECTRIC HEAT TREATING AND ENAMELING FURNACE, by Laurance E. Webber. New Hampshire. University. Engineering Experiment Station, Durham, N. H. Dec 1946. 10p photos, drawings, tables Available from Director, Engineering Experiment Station, University of New Hampshire, Durham, N. H. $.25.
PB 101709

1. Furnaces, Electric - Enameling 2. Enamel and enameling.
Engineering Publication no. 2.

TESTING PROCEDURE FOR "XX" HARD METAL FACED TOOLS. Studiengesellschaft Hartmetall, Berlin. 1935-1936. 21f photos, graphs, tables (Text in German) Mi $2.00, Enl Pr $5.00. PB 101537
1. Tools, Cutting - Hard facing - Cutting tests - Germany 2. BIOS FR 925 LD 3. Micro BIOS HEC 11045 4. Micro BIOS HEC 11047 5. Micro BIOS HEC 11073 6. Micro BIOS FD 3749/47, Frames 1-17.
Abstract available as PB 101537s. 2p. Mi $1.25, Ph $1.25. Listed in BIOS FR 925 appx. I.

TOOL HARDENING. U. S. Bureau of Ships. Jun 1950. 10p drawings Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $.25.
PB 101686

1. Tools, Cutting - Hard facing 2. Tools, Machine - Hard facing 3. NAVSHIPS IN 106.

MEDICAL RESEARCH AND PRACTICE

DYSENTOL. (TABLETS OF MATRINE AND PHENOLSULFONATE SALTS). U. S. 5250th Technical Intelligence Co. Medical Analysis Section, Tokyo. Jul 1946. 5p photos Mi $1.25, Ph $1.25. PB 95813
1. Dysentery - Therapy - Japan 2. Dysentol (Trade name) 3. Matrine, Alkaloid $C_{15}H_{24}N_2O$ - Japan 4. Phenolsulfonate salts - Japan 5. ATIC-T MAS-242.

EFFECTS OF INCREASED ENVIRONMENTAL TEMPERATURES ON THE LIPIDS IN THE BLOOD OF THE TURTLE, CHRYSEMYS PICTA, by Charles G. Wilber and Joel Lieb. Saint Louis University, Saint Louis, Mo. Jun 1950. 22p tables Available from the Business Manager, Saint Louis University Press, St. Louis, Mo. $1.00.
PB 101479

Observations and results are given followed by a discussion and summary. Bibliography and 9 tables attached. Saint Louis University Studies, Series C, Science and Technology, Vol. 1, no. 3.

EMPIRICAL INVESTIGATION OF THE ANALYSIS OF VARIANCE METHOD WHEN THE UNDERLYING ASSUMPTIONS ARE NOT FULFILLED. STATISTICAL DESIGN AND ANALYSIS OF MICROBIOLOGICAL ASSAYS WITH NON-PARALLEL RESPONSE CURVES, by Allyn W. Kumball. U. S. Air Force. School of Aviation Medicine. Randolph Field, Tex. Jul 1950. 19p graphs, tables Mi $1.75, Ph $2.50. PB 101503

The analysis appropriate to this design is derived and is presented in detail. It is recommended that this design and the corresponding analysis be employed in any microbiological assays in which interfering substances affecting growth are present in the test preparation. Graphs, table and references are included. Formerly project number 21-02-037. AAF SAM Proj 21-32-008, Report no. 2.

FORMAL SPOKEN VOCABULARY OF COLLEGE STUDENTS, by Marian Ausherman and John W. Black. U. S. Naval School of Aviation Medicine, Naval Air Station, Pensacola, Fla. May 1950. 111p tables Mi $4.75, Ph $15.00. PB 101506

This study examined the spoken vocabulary of 271 male college students in formal speaking situations. Each student made a series of five-minute classroom speeches, a total of 604 speeches and 298,641 words. There were 6,864 different words used. The words of the speeches are listed in two orders: (1) alphabetically and (2) according to frequency of usage. Bibliography and tables attached. Joint project report no. 3, Ohio State University Research Foundation, Columbus Ohio, under Contract N6ONR 22525, Office of Naval Research Projects Designation no. NR 142-992 and U. S. Naval School of Aviation Medicine, Bureau of Medicine and Surgery Project NM 001064.01.03.

INFLUENCE OF GENERAL HYPOXIA ON LOCAL COLD INJURY, by Josef Pichotka, R. B. Lewis and Ulrich C. Luft. U. S. Air Force. School of Aviation Medicine, Randolph Field, Tex. Jul 1950. 9p graph, tables Mi $1.25, Ph $1.25. PB 101496

Hypoxia did not influence the extent of necrosis if present only during the exposure and in a preparatory period up to 30 minutes. Hypoxia after local cold injury increased the extent of resulting damage, but hypoxia preceding cold injury influenced the outcome in a complicated manner. Graph and tables included. Bibliography attached. Formerly project number 21-02-125. AAF SAM Proj. 21-23-016, Report no. 2.

INTRINSIC INTENSITY OF ORAL PHRASES, by Crayton Walker and John W. Black. U. S. Naval School of Aviation Medicine, Naval Air Station, Pensacola, Fla. May 1950. 42p tables Mi $2.50, Ph $6.25. PB 101504

The primary objective was to establish lists of phrases, equated in natural intensity and duration, that might serve as test materials in studies involving comparisons of either rate or intensity of reading. Two sets of lists were constructed: Set A with 29 equated lists of 8 phrases each; and Set B with 50 equated lists of 5 phrases. There was high consistency in the intensity pattern of a phrase as read by 24 speakers. Joint project report no. 2, Ohio State University Research Foundation, Columbus, Ohio, under Contract N60NR 22525, Office of Naval Research Project Designation no. NR 142-992 and U. S. Naval School of Aviation Medicine, Bureau of Medicine and Surgery Project NM 001 064.01.02. Report is condensed from a Master's thesis by Crayton Walker, and is available at the Chio State University Library.

MEASUREMENT OF THE ACOUSTIC IMPEDANCE AND THE ACOUSTIC ABSORPTION COEFFICIENT OF THE SURFACE OF THE HUMAN BODY, by Henning E. von Gierke. U. S. Air Materiel Command. Engineering Division. Aero-Medical Laboratory, Wright Field, Dayton, Ohio. Mar 1950. 46p diagrs, graphs, tables Mi $2.50, Ph $6.25. PB 101398

Measurements were made of the mechanical impedance and the acoustical absorption coefficient of the human body surface. The measurements were carried out

over soft areas (1-18 cm^2) of the body surface for the frequency range 100 to 18,000 cps. For the lower frequencies the data were obtained from the resonance and damping characteristics of an air filled tube closed at one end by the body. At higher frequencies an aluminum rod pressed against the body was employed instead of the air column. These measuring devices are described and for each device two different measuring methods are treated theoretically. The experimental results show for the body surface the absorption coefficient and the impedance (amplitude and phase) as functions of frequency and measured area. From this data the vibratory energy absorbed by the body surface may be calculated. A theoretical explanation for the measured behavior of the body surface is given. Research and development project identified by Expenditure order no. 695-63. AAF TR 6010.

METHODS FOR THE DETECTION OF TOXIC GASES IN INDUSTRY. LEAFLET NO. 7: CARBON MONOXIDE. GT. BRIT. DEPT. OF SCIENTIFIC AND INDUSTRIAL RESEARCH. REVISED ED. Jun 1950. 10p tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.15. PB 101470

Methods of detection, instructions for conducting the test, and first aid instructions are given. S. O. Code no. 47-112-7-50. DSIR L 7.

PRESSURE IN THE ORAL CAVITY IN THE PRODUCTION OF CONSONANTS, by John W. Black. U. S. Naval School of Aviation Medicine, Naval Air Station, Pensacola, Fla. May 1950. 9p tables Mi $1.25, Ph $1.25. PB 101505

Procedure, results and discussion are given. Bibliography and tables attached. Joint project report no. 4, Ohio State University Research Foundation, Columbus, Ohio, under Contract N60NR 22525, Office of Naval Research Project Designation no. NR 142-992 and U. S. Naval School of Aviation Medicine, Bureau of Medicine and Surgery Project NM 001064.01.04.

PROCEEDINGS OF THE SECOND NATIONAL PUBLIC HEALTH ENGINEERING CONFERENCE, NOV 18-19, 1949, SPONSORED BY THE CIVIL ENGINEERING DEPARTMENT. Florida. University. College of Engineering. Engineering and Industrial Experiment Station, Gainesville, Fla. Jul 1950. 61p. Available from Florida Engineering and Industrial Experiment Station, College of Engineering, University of Florida, Gainesville, Fla. PB 101491

The theme was economics of sewage treatment. The various papers presented are reprinted here. Bulletin series no. 35. Engineering Progress at the University of Florida, Vol. IV, no. 7, Jul 1950.

PROGRESS REPORT ON RESEARCH ON DENTAL MATERIALS, by N. O. Taylor and W. T. Sweeney. Michigan. University. School of Dentistry. Jul 1948. 4p tables Mi $1.25, Ph $1.25. PB 101672

1. Prostheses, Dental - Materials.

Navy contract N6-onr-232, Task order VIII.

REPORT OF STUDIES ON ACCLIMATIZATION, WINTER 1948-1949, by L. D. Carlson, H. L. Burns, W. E. Quinton, R. S. Bark. Washington. University, Seattle, Wash., and Arctic Aero-Medical Laboratory. Aug 1949. 33p drawings, diagrs, graphs, tables Mi $2.25, Ph $5.00. PB 101786

1. Acclimatization 2. Cold - Physiological effects 3. AAF TR 5835.

RESEARCHES ON THE RADIOTHERAPY OF ORAL CANCER, by Constance A.P. Wood and J. W. Boag; with P. Howard-Flanders, A. Glücksmann, L. H. Gray and F.G. Spear.

Gt. Brit. Medical Research Council. Jun 1950. 189p photos (some col.), diagrs, graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $2.85. PB 101469

The first part compares the clinical results of treatment by x-rays and by radium beam. Included is an account of new methods of dosage measurement which have been developed. The second part deals with the response of malignant tissues to irradiation. A third section presents a statistical analysis of the response to treatment of 641 patients. An analysis is also made of certain factors in the clinical history and physical signs of the disease. A statistical method of estimating the final results of a clinical experiment, before long-term survival figures become available is described in appendix A, and this method is used to compare the results of x-ray and radium beam treatment. Conclusions are drawn and suggestions given for further experimental work. Tables, graphs, photographs and photomicrographs included. S. O. Code no. 45-8-67. Color in photos and tables will not reproduce. MRC SR 267.

METALS AND METAL PRODUCTS

DIE ANALYTISCHE UNTERSUCHUNG DER HARTMETALLE (ANALYTICAL INVESTIGATION OF HARD METALS), by Dr. Heyne. Studiengesellschaft Hartmetall, Berlin. Feb-Dec 1937. 34f photos, tables (Text in German) Mi $2.25, Enl Pr $6.25. PB 101538

1. Metals, Hard - Analysis - Germany 2. Micro BIOS HEC 11039 3. Micro BIOS HEC 11056 4. Micro BIOS FD 3738/47, Frames 1-33.

Abstract available as PB 101538s. 1p. Mi $1.25, Ph $1.25. Listed in BIOS FR 925, appx. I.

EFFECTIVENESS OF MOLYBDENUM DISULFIDE AS A FRETTING-CORROSION INHIBITOR, by Douglas Godfrey and Edmond E. Bisson. U. S. National Advisory Committee for Aeronautics. Sep 1950. 21p photos, drawings, tables Mi $2.00, Ph $3.75. PB 101651

Six methods of applying molybdenum disulfide MoS_2 to steel as a fretting-corrosion inhibitor were evaluated. Inhibitor action between steel balls vibrating in contact with glass flats was microscopically observed; number of cycles required to produce incipient fretting corrosion was noted. Experiments with steel flats vibrating in contact with steel flats were also conducted. A bonded MoS_2 coating delayed fretting corrosion for 28,000,000 cycles for steel against glass and about 10,000,000 cycles for steel against steel. Dry MoS_2 and mixtures with water, oil, or grease appreciably delayed fretting corrosion. Without an inhibitor, specimens fretted immediately. Effectiveness of any inhibitor is dependent on its ability to prevent metallic adhesion continuously. NACA TN 2180.

HIGH TENSILE STEELS FOR AIRCRAFT. Germany. Reichsluftfahrtministerium. 1940. 26f photos, drawings, graphs, tables (Text in German) Mi $2.00, Enl Pr $5.00. PB 101603

1. Aircraft - Steel construction - Germany 2. Steel - Manufacture - Germany 3. Micro BIOS FD 2871/46, Item 26, Frames 1-26.

Ringbuch der luftfahrt-technik 11 C 15. Abstract available as PB 101603s. 1p. Mi $1.25, Ph $1.25.

MANUFACTURING PROCESSES FOR ZIRCONIUM, URANIUM, THORIUM AND BERYLLIUM. Deutsche Gold- und Silberscheideanstalt, Frankfort, Ger. n.d. 33f drawings (Text in German) Mi $2.25, Enl Pr $6.25. PB 101694

1. Beryllium - Production - Germany 2. Thorium - Production - Germany 3. Uranium - Production - Germany 4. Zirconium - Production - Germany 5. Micro BIOS FD 1906/47, Frames 1-9.

Abstract available as PB 101694s. 1p. Mi $1.25, Ph $1.25.

METALLURGICAL RESEARCH ON COLD EXTRUSION OF STEEL. Heintz Manufacturing Co., Philadelphia, Pa. Dec 1948. 113p photos, drawing, graphs, tables Mi $4.75, Ph $15.00. PB 96704s3

This report consists chiefly of tabulated data on the physical and mechanical properties of cold extruded steel before and after extrusion. Describes chemical analyses of the steels, heat treatment or annealing of the steels prior to extrusion, tabulated and graphic data, micrographs, and one drawing of punch and die design. Fourth and final report on Contract W-36-034-ORD-7654. For 1st-3rd reports see PB 96704, PB 96704s, PB 96704s2. Sub-Project ORD TB-4-61C pts A,B,D,& E, article 2.

PULVERMETALLURGISCHE STUDIEN I-II. (POWER METALLURGY STUDIES I-II), by J. Heuberger. Chalmers University of Technology, Gothenburg, Sweden. 1950. 22p graphs, tables (Text in German) Mi $2.00, Ph $3.75. PB 101477

Part I. Sintering Properties of Powdered Copper - Graphite Compacts, by J. Hueberger. Discussion and data on the density and hardness of copper-graphite compacts and their dependence on sintering temperature. Part II. The compressibility of powdered iron, by J. Hueberger. Discussion and data on the relationship between density and compacting pressure on various powdered iron samples. Chalmers Tekniska Högskolas Handlingar n. 98. Institutionen för Silikatkemisk Forskning 25. Vortrag gehalten an der Chalmers Technischen Hochschule in Göteborg am 16 Oktober 1949.

REPORT ON THE SELECTION OF DIAMOND POINTS FOR HARDNESS TESTS OF HARD METALS. Studiengesellschaft Hartmetall, Berlin. 1941. 5f tables (Text in German) Mi $1.25, Enl Pr $1.50. PB 101540

1. Diamond tools - Germany 2. Rockwell hardness tests 3. Metals, Hard - Tests - Germany 4. BIOS FR 925 LD 5. Micro BIOS HEC 11340 6. Micro BIOS FD 3900/47, Frames 1-4.

English abstract included. Listed in BIOS FR 925 appx. I.

SURFACE TREATMENT RESEARCH IN CONJUNCTION WITH THE COLD SHAPING OF STEEL. Heintz Manufacturing Co., Philadelphia, Pa. Dec 1948. 55p photos, drawings, graphs, tables Mi $2.75, Ph $7.50. PB 96704s2

This portion of the Heintz report on cold shaping of steel deals entirely with the surface treating for lubrication of the steel in cold extrusion. Describes all the details pertaining to (1) phosphatizing and (2) the choice and preparation of other die lubricants that are used in conjunction with phosphatizing. Third report on Contract W-36-034-ORD-7654. For 1st-2nd and 4th reports, see PB 96704, PB 96704s, PB 96704s3. Sub-Project ORD TB-4-61C. pt. C, article 2.

UBER SINTERKORPER AUS EISEN (SINTERED IRON BODIES). Studiengesellschaft Hartmetall, Berlin. Dec 1941-Jan 1945. 97f photos, graphs, tables (Text in German) Mi $4.25, Enl Pr $13.75. PB 101536

1. Sintering - Research - Germany 2. BIOS FR 925 LD 3. Micro BIOS HEC 11405 4. Micro BIOS HEC 11406 5. Micro BIOS HEC 11417 6. Micro BIOS HEC 11431 7. Micro BIOS HEC 11459 8. Micro BIOS HEC 11400 9. Micro BIOS HEC 11352 10. Micro BIOS FD 3972/47, Frames 1-90.
Listed in BIOS FR 925, appx. I, p. 34, 38-39, 41, 44.

MINERALS AND MINERAL PRODUCTS

INFRARED SPECTRA OF PHOSPHORUS COMPOUNDS, by L. W. Daasch and D. C. Smith. U. S. Naval Research Laboratory. Apr 1950. 57p diagrs, graphs, tables Mi $2.75, Ph $7.50. PB 101494

Infrared spectra of sixty phosphorus compounds have been obtained. Characteristic infrared absorption frequencies are proposed for P-H, P-D, P-F, P-Cl, P-C (Alphatic), P-OH (acidic), P-O-C (ester), phenyl-phosphorus, phosphoryl, and thiophosphoryl groups. Spectral methods for identification, analysis, and determination of structure are discussed and illustrated. The phosphoryl bond is shown to have polar characteristics and to be close to a double bond in strength. Electronic structure of the bond is discussed. A vibrational assignment and practically complete interpretation for the infrared and Raman spectra of trimethylphosphine oxide are included in an appendix. Interim report. NRL R 3657.

METOD FÖR BESTÄMNING AV GLASETS VATTENRESISTENS (METHOD OF MEASURING THE RESISTANCE OF GLASS SURFACES TO WATER ATTACK), av Bo Simmingsköld. Chalmers University of Technology, Gothenburg, Sweden. 1950. 37p photos, graphs, tables (Text in Swedish) Mi $2.25, Ph $5.00. PB 101675

1. Containers, Glass - Resistance to water - Sweden 2. Glass - Research - Sweden 3. Chalmers University of Technology, Gothenburg, Sweden. Transactions no. 97, 1950 4. Chalmers University of Technology, Gothenburg, Sweden. Institute for Silica Chemistry Research 24.
Summary in English. Institutionen för Silikatkemisk Forskning 24.

REFRACTORY MATERIALS FOR USE IN HIGH-TEMPERATURE AREAS OF AIRCRAFT. SUMMARY REPORT, by N. R. Thielke and E. C. Henry. U. S. Air Materiel Command, Wright Field, Dayton, Ohio. Jul 1950. 51p tables Mi $2.75, Ph $7.50. PB 101792

1. Materials, Aircraft - Refractory 2. Ceramic materials - Thermal shock resistance 3. Pennsylvania State College. School of Mineral Industries 4. AAF TR 6080.
From Pennsylvania State College under USAF contracts no. W33-038-ac-16374 (17284) and W33-038-ac-13506.

ORDNANCE AND ACCESSORIES

FLAME PROPAGATION: CRITICAL REVIEW OF EXISTING THEORIES, by George H. Markstein and Michael L. Polanyi. Cornell Aeronautical Laboratory, Buffalo, N. Y. Jun 1947. 83p photos, diagrs, graphs Mi $3.75, Ph $11.25. PB 101446

This report is intended as a comprehensive review of the present state of the

theory of flame propagation in gases. The case of detonation will not be included, the discussion being limited to slow combustion (deflagration). Cover date is Apr 1947. Operating under contract NOrd-8993 with Bureau of Ordnance, U. S. Navy. Bumblebee series Report no. 61.

PHYSICS

General

ADDRESSES AT THE DEDICATION OF THE NOL AEROBALLISTIC RESEARCH FACILITIES, AND AT THE GENERAL SESSION ON AEROMECHANICS RESEARCH, WITH A ROSTER OF PERSONS WHO REGISTERED AT THE DEDICATION CEREMONY AND A LIST OF CONTRIBUTED PAPERS, JUN 27, 1949. U. S. Naval Ordnance Laboratory. Nov 1949. 102p photo Mi $4.50, Ph $13.75. PB 101764

1. Ballistics, Exterior - Research 2. Aeromechanics - Research 3. Wind tunnels, Supersonic - Research 4. Aerodynamics, Supersonic - Research 5. American Physical Society. Fluid Dynamics Division 6. NOLR 1130.

See also PB 101765-PB 101770.

ISENTROPISCHE ZUSTANDSÄN DERUNGEN IN DISSOZIIERENDEN GASEN UND DIE METHODE DER SCHALLDISPERSION ZUR UNTERSUCHUNG SEHR SCHNELLER HOMOGENER GASREAKTIONEN. (ISENTROPIC PHASE CHANGES IN DISSOCIATION GASES AND THE METHOD OF SOUND DISPERSION FOR THE INVESTIGATION OF HOMOGENEOUS GAS REACTIONS WITH VERY HIGH SPEED), by Gerhard Damköhler. Sep 1950. 58p graphs, tables Mi $2.75, Ph $7.50. PB 101553

Very fast gas reactions, particularly at high temperature, can be studied in terms of the isentropic property changes that occur. These reactions can be followed by noting the variation of sound velocity with frequency (sound dispersion). Earlier analytical treatments are extended and generalized to cover changes associated with dissociating or reacting gases, as well as the effect of the sound field on the establishment of chemical and physical equilibrium. Translation from Zeitschrift für Electrochemie, Bd. 48 nr. 2, 1942, p. 62-82. Conclusion of this paper, sections V to VIII, has been published as NACA TM 1269 (PB 101615). NACA TM 1268.

ISENTROPISCHE ZUSTANDSÄN DERUNGEN IN DISSOZIIERENDEN GASEN UND DIE METHODE DER SCHALLDISPERSION ZUR UNTERSUCHUNG SEHR SCHNELLER HOMOGENER GASREAKTIONEN. (ISENTROPIC PHASE CHANGES IN DISSOCIATING GASES AND THE METHOD OF SOUND DISPERSION FOR THE INVESTIGATION OF HOMOGENEOUS GAS REACTIONS WITH VERY HIGH SPEED), by Gerhard Damköhler. Sep 1950. 41p graphs, tables Mi $2.50, Ph $6.25. PB 101615

The analytical results of Part I are also applied to sound dispersion by friction and heat conduction. An irreversible change of momentum, energy, and type of particle corresponding to friction, heat conduction, and diffusion effects can appear both in the direction of the sound field and traverse to it. Longitudinal damping, the coupling of longitudinal damping and that due to chemical and physical changes, and coupling of diffusion and compositional changes are treated for a plane sound wave of infinite extent. The same principals are also applied to sound effects in cylindrical tubes. The limitations of the method are discussed in some detail. NACA TM 1269.

LIST OF PERIODICALS OF PHYSICS INTEREST, COMPILED by Robert S. Bray. American Institute of Physics. Aug 1950. 39p Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $.50. PB 110082
1. Physics - Periodicals - Bibliography.

SYMPOSIUM ON SHOCK-WAVE PHENOMENA. JOINT MEETING WITH THE FLUID DYNAMICS DIVISION OF THE AMERICAN PHYSICAL SOCIETY, JUN 30, 1949. U.S. Naval Ordnance Laboratory. Jul 1950. 97p photos, diagrs, graphs, tables Mi $4.25, Ph $12.50. PB 101769
1. Ballistics, Exterior - Research 2. Aeromechanics - Research 3. Wind tunnels, Supersonic - Research 4. Aerodynamics, Supersonic - Research 5. Shock waves 6. American Physical Society. Fluid Dynamics Division 7. NOLR 1135.
See also PB 101764 - PB 101768; PB 101770.

SYMPOSIUM ON TURBULENCE. JOINT MEETING WITH THE FLUID DYNAMICS DIVISION OF THE AMERICAN PHYSICAL SOCIETY, JUL 1, 1949. U. S. Naval Ordnance Laboratory. Jul 1950. 87p diagrs, graphs Mi $3.75, Ph $11.25. PB 101770
1. Ballistics, Exterior - Research 2. Aeromechanics - Research 3. Wind tunnels, Supersonic - Research 4. Aerodynamics, Supersonic - Research 5. Turbulence - Research 6. American Physical Society. Fluid Dynamics Division 7. NOLR 1136.
See also PB 101764 - PB 101769.

PSYCHOLOGY

PILOT FLIGHT TEST REPORT FOR THE AIRLINE TRANSPORT RATING FLIGHT EXAMINATION. U. S. Civil Aeronautics Administration. Mar 1950. 24p diagrs, tables Mi $2.00, Ph $3.75. PB 101676
1. Pilots, Air - Ability tests.
See also PB 101677 and PB 101678.

RUBBER AND RUBBER PRODUCTS

DRAWINGS OF EQUIPMENT, NOTES, AND REPORTS RELATING TO PLASTIKATOR 32. CONSTITUTION OF SAMPLES OF NUMBERED BUNA. I. G. Farbenindustrie A. G., Schkopau, Ger. 1941-1944. 104f photos, diagrs, drawings, graphs, tables (Text in German) Mi $4.50, Enl Pr $15.00. PB 101598
1. Plastikator 32 (Trade name) 2. Rubber, Buna - Plasticizers - Germany 3. Rubber, Buna - Analysis - Germany 4. GP 743,555 12a/5 Dec 29, 1943 5. Micro BIOS FD 2257/47, Frames 1-86.
Abstract available as PB 101598s. 2p. Mi $1.25, Ph $1.25.

LABORATORY NOTES AND TEMPERATURE CHARTS ON HYDROGENATION TESTS OF VINYL CHLORIDE TO ETHYL CHLORIDE, INCLUDING TESTS OF MATERIALS FOR EQUIPMENT. I. G. Farbenindustrie A. G., Schkopau, Ger. 1941-1943. 72f graphs, tables (Text in German) Mi $3.50, Enl Pr $11.25. PB 101576
1. Ethane, Chloro - Production - Germany 2. Vinyl chloride - Hydrogenation - Germany 3. Micro BIOS FD 2640/47, Frames 1-71.
Abstract available as PB 101576s. 1p. Mi $1.25, Ph $1.25.

MONTHLY REPORTS AND TEST REPORTS ON THE PRODUCTION OF DIOXANE, ON PILOT PLANT TESTS OF CHLOROHYDRIN PRODUCTION, AND ON EXPERIMENTS TO MAKE BUTADIENE FROM BUTYLENE. I. G. Farbenindustrie A. G., Schkopau, Ger. 1943-1944. 9f (Text in German) Mi $1.25, Enl Pr $2.50.
PB 101577

1. Dioxane - Production - Germany 2. Chlorohydrin - Production - Germany 3. Butadiene - Production - Germany 4. Micro BIOS FD 2642/47, Frames 1-7.
Abstract available as PB 101577s. 2p. Mi $1.25, Ph $1.25.

REPORTS AND CORRESPONDENCE ON THE PRODUCTION AND USE OF "DIPROXID" FOR PROCESSING BUNA. I. G. Farbenindustrie A. G., Schkopau, Ger. 1939-1944. 147f graphs, tables (Text in German) Mi $5.75, Enl Pr $20.00. PB 101524

1. Diproxid (Trade name) 2. Rubber, Buna - Polymerization - Germany 3. Micro BIOS FD 2199/47, Frames 1-143.
Abstract available as PB 101524s. 1p. Mi $1.25, Ph $1.25.

RESILIENCE TESTS AND TESTING EQUIPMENT. I. G. Farbenindustrie A. G., Schkopau, Ger. Jan-Feb 1944. 16f (Text in German) Mi $1.75, Enl Pr $3.75.
PB 101741

1. Rubber, Buna - Resilience - Germany 2. Rubber, Buna - Testing equipment - Germany 3. Micro BIOS FD 2358/47, Frames 1-15.
Abstract available as PB 101741s. 1p. Mi $1.25, Ph $1.25.

STANDARD RULES FOR TESTING THE PROPERTIES OF SYNTHETIC RUBBER. TESTING OF PLASTICS. I. G. Farbenindustrie A. G., Schkopau, Ger. 1939-1941. 55f tables (Text in German) Mi $2.75, Enl Pr $8.75. PB 101522

1. Rubber, Synthetic - Tests - Germany 2. Plastics - Tests - Germany 3. Micro BIOS FD 1157/49, Frames 1-53.
Abstract available as PB 101522s. 2p. Mi $1.25, Ph $1.25.

TESTS AND TESTING EQUIPMENT FOR DETERMINING THE DEFO-VALUE, THE M-VALUE (SUSCEPTIBILITY TO GELLING), AND K-VALUE OF BUNA AND PLASTICS. I. G. Farbenindustrie A. G., Schkopau, Ger. 1940-1943. 38f drawings, tables (Text in German) Mi $2.25, Enl Pr $6.25. PB 101523

1. "Defo" value - Determination - Germany 2. M-value - Determination - Germany 3. K-value - Determination - Germany 4. Rubber, Buna - Tests - Germany 5. Rubber, Buna - Testing equipment - Germany 6. Plastics - Tests - Germany 7. Plastics - Testing equipment - Germany 8. Micro BIOS FD 1156/49, Frames 1-35.
Abstract available as PB 101523s. 2p. Mi $1.25, Ph $1.25.

VULKANISATION VON BUNA S UND BUTADIENMISCHPOLYMERISATEN MIT DIAZOAMINOBENZOL (VULCANIZATION OF BUNA S AND BUTADIENE MIXED POLYMERIZATION PRODUCTS WITH DIAZOAMINOBENZENE), by Dr. B. Scheurle. I. G. Farbenindustrie A. G., Schkopau, Ger. Oct 1943. 66f photo, tables (Text in German) Mi $3.00, Enl Pr $10.00. PB 101556

1. Buna S (Trade name) 2. Rubber, Buna - Vulcanization - Germany 3. Patents - Germany O.Z. 14409, Sep 23, 1943 4. Patents - Germany O.Z. 14505 Dec 10, 1943 5. Patents - Germany O.Z. 14599 Jan 12, 1944 6. Micro BIOS FD 2232/47, Frames 1-63.
Abstract available as PB 101556s. 2p. Mi $1.25, Ph $1.25.

STRUCTURAL ENGINEERING

BEITRAG ZUR FRAGE DER BEULUNG ORTHOTROPER PLATTEN, INSBESONDERE VON SPERRHOLZPLATTEN. (CONTRIBUTION TO THE PROBLEM OF BUCKLING OF ORTHOTROPIC PLATES WITH SPECIAL REFERENCE TO PLYWOOD), by Wilhelm Thielemann. Aug 1950. 122p drawings, graphs, tables Mi $5.00, Ph $16.25. PB 101424

Planar stress-strain relations and bending stress-strain relations are presented for elastic orthotropic plates and specialized to plywood. These relations are used to derive the differential equation and energy expression for the buckling of orthotropic rectangular plates whose principal stiffness directions are not parallel to the plate edges. Buckling analyses are made for the cases of pure compression and pure shear of a long plate-strip. NACA TM 1263.

BUCKLING OF COMPRESSED STEEL MEMBERS, by Georg Wästlund and Sven G. Bergström. Sweden. Kungl. Tekniska Högskolan, Stockholm. 1949. 173p photos, graphs, tables Mi $6.50, Ph $22.50. PB 101369

This report gives a thorough and competent review of the state of the column buckling problem up to the time of its publication in 1949. It presents the results of numerous new tests on bars and frames made of steel. This collection of information is used to prepare a proposed new Swedish standard specification for design of compressed steel members. Although much of the theoretical material presented is not new, the presentation of it in a unified whole is of considerable value. The considered opinion represented in the standards should be of interest to groups responsible for setting up American Standards. Transactions of the Royal Institute of Technology, Stockholm, Sweden. no. 30, 1949. Acta Polytechnica no. 56, 1949. Civil Engineering and Building Construction Series, Vol. 1, no. 10.

COMBINED BENDING AND TORSION OF SIMPLY SUPPORTED BEAMS OF BISYMMETRICAL CROSS SECTION, by Ove Pettersson. Sweden. Kungl. Tekniska Högskolan, Stockholm. 1949. 45p diagrs, graphs Mi $2.50, Ph $6.25. PB 101508

In combined bending and torsion of deep and slender beams it is not correct to calculate the total stress by addition of the pure bending and torsional stresses. In fact, the risk of lateral buckling causes the stresses to increase. In this paper a fundamental case of combined bending and torsion is studied, namely, a simply supported I beam of bisymmetrical cross section submitted to an oblique eccentric load at the centre of span. It is shown that the total stress can be calculated from the pure bending and torsional stresses after multiplication by factors which are dependent on the ratio of the actual load and the critical load in lateral buckling. Bulletin no. 3 from the Division of Building Statics and Structural Engineering. Acta polytechnica no. 55. Sweden. Kungl. Tekniska Högskolan. Handlingar no. 29.

CRITICAL STRESS OF PLATE COLUMNS, by John C. Houbolt and Elbridge Z. Stowell. U. S. National Advisory Committee for Aeronautics. Aug 1950. 16p drawing, graphs Mi $1.75, Ph $2.50. PB 101382

An exact solution is given for the elastic buckling stress of a flat rectangular plate with simply supported ends when loaded as a column, and an energy solution in which power series and undetermined multipliers are used is made for the case of

fixed ends. The critical stress is given in terms of the Euler column-buckling value of the load multiplied by a coefficient which depends on the width-length ratio of the plate. A point of theoretical interest on the buckling of a very wide plate is presented. NACA TN 2163.

EXPERIMENTAL INVESTIGATION OF STIFFENED CIRCULAR CYLINDERS SUBJECTED TO COMBINED TORSION AND COMPRESSION, by James P. Peterson. U. S. National Advisory Committee for Aeronautics. Sep 1950. 15p photo, drawing, graphs Mi $1.75, Ph $2.50. PB 101618

Five stiffened circular cylinders were tested to failure under various combinations of torsion and compression. The results of the tests are presented in the form of plots of stringer stress against cylinder load and an interaction curve for the strength of stringers that fail by local crippling. A method is given for calculating stiffener stresses in cylinders subjected to combined loads, and a comparison between calculated and experimental stringer stresses is made. NACA TN 2188.

MORTAR FOR BRICKWORK, BLOCK CONSTRUCTION AND MASONRY, by H. Andrews. Gt. Brit. Dept. of Scientific and Industrial Research. Building Research Station, Watford, England. Feb 1950. 23p photos, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.30. PB 101450

This bulletin discusses the properties of mortars for use in brickwork, blockwork, or masonry work. Recommendations based on practical experience and experimental trial are given for the various conditions usually encountered in practice. S. O. Code no. 47-549-8. DSIR NB B 8.

STABILITY OF THE COMPRESSION COVER OF BOX BEAMS STIFFENED BY POSTS, by Paul Seide and Paul F. Barrett. U. S. National Advisory Committee for Aeronautics. Aug 1950. 29p graphs, tables Mi $2.00, Ph $3.75. PB 101429

An investigation is made of the buckling of the compression cover of post-stiffened box beams subjected to end moments. Charts are presented for the determination of the minimum post axial stiffnesses and the corresponding compressive buckling loads required for the compression cover to buckle with nodes through the posts. Application of the charts to design and analysis and the limitations of their use are discussed. NACA TN 2153.

STATIC AND IMPACT STRENGTHS OF RIVETED AND SPOT-WELDED BEAMS OF ALCLAD 14S-T6, ALCLAD 75S-T6, AND VARIOUS TEMPERS OF ALCLAD 24S ALUMINUM ALLOY, by H. E. Grieshaber. U. S. National Advisory Committee for Aeronautics. Aug 1950. 36p photos, drawings, graphs, tables Mi $2.25, Ph $5.00. PB 101430

Tests were made to determine the comparative strengths under static and impact loading of built-up riveted and spot-welded beams of Alclad 14S-T6, Alclad 75S-T6, Alclad 24S-T3, Alclad 24S-T36, Alclad 24S-T81, Alclad 24S-T86, and Alclad 24S-T3 aluminum alloy artifically aged to -T81 after assembly. NACA TN 2157.

TORSIONAL AND LATERAL BUCKLING OF ECCENTRICALLY COMPRESSED I AND T COLUMNS, by Henrik Nylander. Sweden. Kungl. Tekniska Högskolan, Stockholm. 1949. 34p graphs, tables Mi $2.25, Ph $5.00. PB 101507

The behaviour of steel columns of monosymmetrical or bisymmetrical cross section is studied. Expressions for the critical load of perfectly straight members in torsional and lateral buckling are given. Various types of cross sections are studied.

Modified formulae are given for oblique loads. The Appendix gives tables and diagrams facilitating calculation of some common standard sections. Bulletin no. 2 from the Division of Building Statics and Structural Engineering. Acta polytechnica no. 54. Sweden. Kungl. Tekniska Högskolan. Handlingar no. 28.

WEATHERING, PRESERVATION AND MAINTENANCE OF NATURAL STONE MASONRY (PART I). Gt. Brit. Dept. of Scientific and Industrial Research. Building Research Station, Watford, England. Jul 1950. 8p diagrs Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.05.
PB 101449

This report prepared as the result of inquiries at the Building Research Station, describes the more important causes of the weathering and decay of stone masonry and discusses aspects of the maintenance and restoration of stone buildings. S. O. Code no. 72-22-0-20. DSIR BRD 20.

TEXTILES AND TEXTILE PRODUCTS

AIRCRAFT MATERIAL SPECIFICATION. 3 1/4 OZ. COTTON FABRIC. Gt. Brit. Ministry of Supply. May 1950. 1p Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.15. PB 101878
1. Fabrics, Cotton - Specifications - Gt. Brit. 2. MS DTD MS 813.

FIBROGRAM: INVESTIGATIONS ON THE INFLUENCE OF FIBRE LENGTH AND ITS DISTRIBUTION, ON THE WORKING PROGRESS IN PAUL'S DRAW FIELD, AND ON THE PROPERTIES OF YARN AND FABRIC, by Stig Löfgren. 1950. 143p photos, diagrs, graphs, tables Mi $5.75, Ph $18.75. PB 101468
The eleven chapters cover the following topics: 1. Survey of previous work, 2. Definitions, 3. Statistical computations on the fibre movement, 4. Sliver testing methods used and the control of them, 5. Drafting under simplified conditions, 6. Influence of the setting, 7. Influence of the draft ratio, 8. Influence of drafting on sliver thickness distribution, 9. Drafting under industrial forms, 10. Fibre length distribution and yarn properties, 11. Fibre length distribution and fabric properties. Summary and bibliography attached. Tables, graphs, and photographs included. Thesis - Chalmers University of Technology, Gothenburg, Sweden, 1950. Doktrosavhandlingar vid Chalmers Tekniska Högskola, nr. 5. Svenska Textilforskningsinstitutet, Gothenburg. Meddelanden no. 12, 1950.

GRELINS EN CHANVRE, MANILLE ET SISAL A 3 ET 4 AUSSIERES. (CABLES MADE OF HEMP, MANILA AND SISAL WITH 3 AND 4 CORDS). French Standards Society (AFNOR). Sep 1949. 10p tables Mi $1.25, Ph $1.25. PB 101492
Part I. Generalitics, Part II. Manufacture, and Part III. Specifications. Tables attached. French standard specification NF G36-002. Translated by F. Rizzo, Code 366, Navy Department Bureau of Ships. June 1950. NAVSHIPS T 383.

TREATMENT OF NYLON WEBBING TO INCREASE RESISTANCE TO ABRASION, by C. A. Willis. U. S. Air Materiel Command. Engineering Division. Materials Laboratory, Wright Field, Dayton, Ohio. May 1948. 35p photos, tables Mi $2.25, Ph $5.00. PB 101785
1. Webbing, Nylon - Abrasion resistance 2. AAF TR 5699.

ULLVAXETS INFLYTANDE PA NAGRA AV ULLFIBERNS EGENSKAPER (INFLUENCE OF THE WAX CONTENT OF THE WOOL FIBRE ON SOME OF THE FIBRE PROPERTIES), av Stig Kjellstrand. Royal Swedish Academy of Engineering Sciences. 1950. 25p graphs, tables (Text in Swedish) Mi $2.00, Ph $3.75. PB 101466

The influence of the wax content of the wool fibre on some of the fibre properties has been investigated. Tests have been performed on greasy wool, wool steeped in water, wool given a normal scour with soda and soap, wool treated with trichloroethylene and wool extracted with ether. Rigidity and tensile strength (dry and wet) are independent of the wax content. Resistance to abrasion, cloth against cloth, increases rapidly with increasing wax content. Some experiments indicated that wool wax might have a retarding influence on the rates of water adsorption and desorption, even when present in small quantities. Handlingar nr. 204. Abstract in English.

TRANSPORTATION EQUIPMENT

Aeronautics

Aircraft

ANALYSIS OF THE EFFECTS OF BOUNDARY-LAYER CONTROL ON THE POWER-OFF LANDING PERFORMANCE CHARACTERISTICS OF A LIAISON TYPE OF AIRPLANE, by Elmer A. Horton, Laurence K. Loftin, Jr., and Stanley F. Racisz. U. S. National Advisory Committee for Aeronautics. Aug 1950. 51p diagr, tables Mi $2.75, Ph $7.50. PB 101372

An investigation was made to determine the effects of boundary-layer control on the landing performance characteristics of a liaison type of airplane having a pay load of 1500 pounds and a flight duration of 5 hours. The aspect ratio was varied from 5 to 15, the wing span from 30 to 100 feet, and the brake horsepower from 300 to 1200. The use of boundary-layer control caused reduction in total landing distance (25 to 40 percent), ground-run distance, gliding speed, and stalling speed whereas sinking speed was increased only slightly. NACA TN 2143.

ANALYSIS OF THE NORMAL ACCELERATIONS AND AIRSPEEDS OF A FOUR-ENGINE AIRPLANE TYPE IN POSTWAR COMMERCIAL TRANSPORT OPERATIONS ON TRANS-PACIFIC AND CARRIBBEAN - SOUTH AMERICAN ROUTES, by Thomas L. Coleman and Paul W. J. Schumacher. U. S. National Advisory Committee for Aeronautics. Aug 1950. 18p graphs, tables Mi $1.75, Ph $2.50. PB 101621

Contains an analysis of 22,628 flight hours of normal-acceleration and airspeed data taken on several transport airplanes of a four-engine type. These data for postwar commercial transport operations were taken on trans-Pacific and Caribbean - South American routes of one airline. The results indicate that the frequency of exceeding the never-exceed speed and the acceleration increment corresponding to the limit-gust-load-factor increment vary appreciably between the two sets of operations. NACA TN 2176.

ANTISYMMETRICAL FLUTTER OF A LARGE TRANSPORT AEROPLANE, by W. Prichard Jones. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Jul 1944. 13p graphs, tables Available from British Information Services, 30

Rockefeller Plaza, New York 20, N. Y. $.65. PB 101779

In an earlier report on binary wing-aileron flutter of this particular aircraft, it was shown that antisymmetrical flexure-aileron flutter could occur at low airspeeds when the ailerons were mass-underbalanced. The influence on this type of flutter of mobility of the fuselage in roll and the elasticity of the wings in torsion is now considered. An estimate of the amount of artificial aileron damping required to prevent flutter which involves aileron motion relative to the wing is also made. Cover date is 1950. S. O. Code no. 23-2363. ARC RM 2363.

CALCULATION OF THE EFFECT OF SLIPSTREAM ON LIFT AND INDUCED DRAG, by H. B. Squire and W. Chester. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Oct 1945. 26p diagrs, graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $1.25. PB 101662

The lift distribution along a wing of infinite span with a central jet of higher velocity is calculated by standard methods of aerofoil theory for several values of (jet velocity/stream velocity) and of (jet diameter/wing chord). The lift increment and the induced drag are determined and the application of the results to practical cases is discussed. Cover date is 1950. S. O. Code no. 23-2368. Contents: Part I. Wing of infinite span. p. 1-14 - Part II. Slipstream rotation. p. 15-19. - Part III. Minimum induced drag. p. 20-26. ARC RM 2368.

COMPARISON OF THE EXPERIMENTAL PRESSURE DISTRIBUTION OF AN NACA 0012 PROFILE AT HIGH SPEEDS WITH THAT CALCULATED BY THE RELAXATION METHOD, by James L. Amick. U. S. National Advisory Committee for Aeronautics. Aug 1950. 9p photos, graphs Mi $1.25, Ph $1.25. PB 101484

Presents pressure-distribution measurements on a 5-inch-chord NACA 0012 airfoil at zero angle of attack in the Langley rectangular high-speed tunnel, a 4- by 18-inch closed-throat wind tunnel, at Mach numbers up to 0.75. At the higher Mach numbers the measured pressures over most of the airfoil chord were higher than those calculated by the relaxation method. NACA TN 2174.

DEVELOPMENT AND PERFORMANCE OF TWO SMALL TUNNELS CAPABLE OF INTERMITTENT OPERATION AT MACH NUMBERS BETWEEN 0.4 AND 4.0, by Walter F. Lindsey and William L. Chew. U. S. National Advisory Committee for Aeronautics. Sep 1950. 91p photos, drawings, graphs Mi $4.25, Ph $12.50. PB 101813

The design, development, and performance of equipment suitable for use by educational institutions for student training and basic compressible flow research is described. The equipment consists of an induction tunnel having a 4- by 16-inch test section and capable of operating at Mach numbers ranging from about 0.4 to 1.4 and a blowdown tunnel having a 4- by 4-inch test section for supersonic Mach numbers up to about 4.0. NACA TN 2189.

DIRECT METHOD OF DESIGN AND STRESS ANALYSIS OF ROTATING DISKS WITH TEMPERATURE GRADIENT, by S. S. Manson. U. S. National Advisory Committee for Aeronautics. 1950. 17p diagrs, graphs, tables Available from Supt. of Documents, U. S. Government Printing Office, Washington 25, D. C. $.15. PB 101433

A method is presented for the determination of the contour of disks, typified by those of aircraft gas turbines, to incorporate arbitrary elastic-stress distributions resulting from either centrifugal or combined centrifugal and thermal effects. NACA Report 952.

EFFECT OF A FLEXURALLY-GEARED AILERON CONTROL ON BINARY FLUTTER OF A WING-AILERON SYSTEM, by W. Prichard Jones. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Feb 1944. 25p diagrs, drawings, graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $1.15. PB 101659

The use of a flexurally-geared aileron control to minimize the effect of gusts on wings of large aspect ratio has been suggested recently. In this report the influence of such a control on the flutter characteristics of a wing aileron system is investigated theoretically. Cover date is 1950. S. O. Code no. 23-2362. ARC RM 2362.

EFFECT OF AN UNSWEPT WING ON THE CONTRIBUTION OF UNSWEPT-TAIL CONFIGURATIONS TO THE LOW-SPEED STATIC- AND ROLLING-STABILITY DERIVATIVES OF A MIDWING AIRPLANE MODEL, by William Letko and Donald R. Riley. U. S. National Advisory Committee for Aeronautics. Aug 1950. 45p photo, drawings, graphs Mi $2.50, Ph $6.25. PB 101426

Wind-tunnel results of the effects of an unswept wing on the contribution of unswept-tail configurations to the low-speed static- and rolling-stability derivatives of a midwing model and comparisons of the measured contributions with those calculated by current available procedures are presented. NACA TN 2175.

EFFECT OF HEAT-CAPACITY LAG ON THE FLOW THROUGH OBLIQUE SHOCK WAVES, by H. Reese Ivey and Charles W. Cline. U. S. National Advisory Committee for Aeronautics. Oct 1950. 28p graphs Mi $2.00, Ph $3.75. PB 101814

An analysis is made of the effects of variable heat capacity on the flow parameters for oblique shock waves at high supersonic speeds at sea level. A simple equation is derived for calculating pressure coefficients over thin airfoils as an explicit function of Mach number, flow deflection, and ratio of specific heats for a wide range of free-stream Mach numbers. NACA TN 2196.

EXPERIMENTAL INVESTIGATION OF THE EFFECT OF VERTICAL TAIL SIZE AND LENGTH AND OF FUSELAGE SHAPE AND LENGTH OF THE STATIC LATERAL STABILITY CHARACTERISTICS OF A MODEL WITH 45° SWEPTBACK WING AND TAIL SURFACES, by M. J. Queijo and Walter D. Wolhart. U. S. National Advisory Committee for Aeronautics. Aug 1950. 56p photos, drawings, graphs, tables Mi $2.75, Ph $7.50. PB 101619

Results are presented of an investigation made to determine the effects of vertical-tail size and length and of fuselage shape and length on the lateral-static-stability derivatives of a midwing airplane model with 45° sweptback wing and tail surfaces. Interference between the various model components also is evaluated. NACA TN 2168.

FLIGHT INVESTIGATION AND ANALYSIS OF THE LATERAL-OSCILLATION CHARACTERISTICS OF AN AIRPLANE, by Carl J. Stough and William M. Kauffman. U. S. National Advisory Committee for Aeronautics. Oct 1950. 29p photos, drawings, graphs Mi $2.00, Ph $3.75. PB 101857

The causes of undesirable lateral oscillations of airplanes usually called "snaking" were investigated and various rudder modifications designed to aleviate this condition were tested. It was found that the rudder-fixed oscillations were predictable using present theory and that the "snaking" or low damping was attributed to the hinge-moment characteristics of the rudder. The possibility of a further decrease in the damping of the oscillation due to adverse effects of Mach number on the rudder hinge moments was discussed. NACA TN 2195.

FRONT EXPERIENCES ON ICE FORMATION, by Herr Oppermann. Jun 1950. 8p tables Mi $1.25, Ph $1.25. PB 101613

1. Aircraft - Ice formation - Germany 2. Ice formation - Germany 3. NAVSHIPS T 386.

Development group on ice formation. Report no. 6. Published by the Aerodynamic Research Institute, Gottingen Institute for Low Temperature Research. Translated by F. Rizzo.

GUST-TUNNEL INVESTIGATION OF A WING MODEL WITH SEMICHORD LINE SWEPT BACK 60°, by Harold B. Pierce. U. S. National Advisory Committee for Aeronautics. Oct 1950. 14p photo, drawing, graphs Mi $1.75, Ph $2.50. PB 101854

An investigation was made in the Langley gust tunnel of a 60° sweptback-wing model to determine its response to gusts. On the basis of the results, a simplified method of analysis, which uses a slope of the lift curve derived by the cosine law and which uses strip theory to estimate the penetration effect, appears to be applicable for the prediction of gust loads on wings swept as much as 60°. NACA TN 2204.

INDICATION OF BOUNDARY-LAYER TRANSITION ON AEROFOILS IN THE N. P. L. 20 IN. X 8 IN. HIGH SPEED WIND TUNNEL, by H. H. Pearcey. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Dec 1948. 15p photos, diagr, graphs Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.35. PB 101780

The "liquid film" evaporation method developed by Gray for indicating the position of boundary-layer transition on models in low speed wind tunnels has proved satisfactory. Observation of transition over the complete span of the model can be simultaneous with that of surface pressures, profile drag and flow pattern. Direct shadow photographs taken in this tunnel also give an approximate indication of the transition point in certain cases. Cover date is 1950. S. O. Code no. 23-9006-10. ARC CP 10.

INVESTIGATION OF A TWO-STEP NOZZLE IN THE LANGLEY 11-INCH HYPERSONIC TUNNEL, by Charles H. McLellan, Thomas W. Williams, and Mitchel H. Bertram. U. S. National Advisory Committee for Aeronautics. Sep 1950. 58p photos, diagrs, drawings, graphs Mi $2.75, Ph $7.50. PB 101551

The flow through a two-step-expansion nozzle with a design Mach number of 6.98 was investigated. This nozzle was mounted in a blowdown-type wind tunnel. The problems involved in such a system are reviewed. Although a maximum Mach number of about 6.5 was obtained, the nozzle was found unsatisfactory for model testing because of the large flow gradients. NACA TN 2171.

LOW-SPEED CHARACTERISTICS OF FOUR CAMBERED, 10-PERCENT-THICK NACA AIRFOIL SECTIONS, by George B. McCullough and William M. Haire. U. S. National Advisory Committee for Aeronautics. Aug 1950. 25p drawings, graphs, tables Mi $2.00, Ph $3.75. PB 101620

Low-speed lift, drag, and pitching-moment characteristics have been obtained for 10-percent-thick sections of the NACA four-digit- and 64A-series airfoil sections, each cambered with the same a-type mean line for design lift coefficients of both 0.3 and 0.8. The NACA four-digit-series sections achieved greater values of maximum lift than did the corresponding NACA 64A-series sections, but this superiority was less marked for the more highly cambered sections. NACA TN 2177.

LOW-SPEED INVESTIGATION OF THE STALLING OF A THIN, FAIRED, DOUBLE-WEDGE AIRFOIL WITH NOSE FLAP, by Leonard M. Rose and John M. Altman. U. S. National Advisory Committee for Aeronautics. Aug 1950. 24p photo, drawing, graphs Mi $2.00, Ph $3.75. PB 101427

The stalling characteristics of a 4.23-percent-thick, faired, double-wedge airfoil section with and without nose flap were investigated. Flap chords of 12, 16, 20, and 25 percent of the airfoil chord were tested. Results of force and pressure-distribution measurements as well as studies of the flow above the airfoil are presented for a Reynolds number of 5,800,000 and a Mach number of 0.17. NACA TN 2172.

LOW-SPEED WIND TUNNEL TESTS OF A HIGH-LIFT SUPERSONIC WING, by W.S.D. Marshall, I. Levaćić, A. D. Young and G. J. Powter. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Sep 1948. 24p photos, diagrs, graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $1.15. PB 101658

Tests have been made on a rectangular wing of biconvex section 7.5 per cent. thick with a flap and leading-edge slat of rather unusual design (Part I). The flap was of slotted semi-Fowler type; its chord was equal to 0.25 of the wing chord and it was set at an angle of 46 deg. Cover date is 1950. S. O. Code no. 23-2365. ARC RM 2365.

MEASUREMENT OF THE MOMENTS OF INERTIA OF AN AIRPLANE BY A SIMPLIFIED METHOD, by Howard L. Turner. U. S. National Advisory Committee for Aeronautics. Oct 1950. 41p photos, drawing, graph, tables Mi $2.50, Ph $6.25. PB 101852

The moments of inertia about the body reference axes, the principal axes, the product of inertia, and the inclination of the principal axes were determined experimentally for a 13,000-pound airplane. Description of the equipment and techniques and sample calculations are presented. Knife-edge supports and restraining springs were used for measurements about the pitch and roll axes. A single-shaft torsional pendulum was used for yaw-axis measurement. Simplicity of operation, ease of handling, adaptability to very heavy aircraft, and inherent accuracy of the methods are discussed. NACA TN 2201.

METHOD FOR DETERMINING PRESSURE DROP OF AIR FLOWING THROUGH CONSTANT-AREA PASSAGES FOR ARBITRARY HEAT-INPUT DISTRIBUTIONS, by Benjamin Pinkel, Robert N. Noyes, and Michael F. Valerino. U. S. Naticnal Advisory Committee for Aeronautics. Sep 1950. 70p graphs (part fold) Mi $3.00, Ph $8.75. PB 101775

A method is developed that enables the convenient determination of the pressure drop sustained by air flowing at high subsonic speeds in constant-area passages under simultaneous influence of friction and arbitrary heat addition. The pressure drop is obtained from working-size charts that describe the compressible-air-flow process throughout the passage length. NACA TN 2186.

METHOD OF MEASURING AIRCRAFT SPEED AND POSITION ERROR USING DOPPLER RADIO, by E. L. R. Webb. Canada. Royal Canadian Air Force. Experimental and Proving Establishment, Rockcliffe, Canada. Jul 1950. 20p diagr, graphs, tables Mi $1.75, Ph $2.50. PB 101856

1. Airplanes - Speed - Canada 2. Airplanes - Altitude effects - Canada 3. Doppler (Radio) 4. RCAF EPE 960.

RCAF Development report: Interim D66/1. AMRD directive number 18-46 dated 29th October 1946. Issued by AMTS.

MUSTANG AIRCRAFT BRIDLE ATTACHMENT FOR TARGET TOWING, by A. V. Rugienius. Canada. Royal Canadian Air Force. Experimental and Proving Establishment, Rockcliffe, Canada. Jun 1950. 21p photos, tables Mi $2.00, Ph $3.75. PB 101444

1. Targets, Aerial - Towing equipment - Canada 2. Airplanes - Target towing equipment - Canada 3. Mustang (Airplane) 4. RCAF EPE 956.

RCAF Development report: Final GAW 2-12/49 Pt. I. Reference: AMTS Directive 23-49 dated 30th December 1949.

NOTE ON THE EFFECT OF COMPRESSIBILITY ON THE PROFILE DRAG OF AEROFOILS AT SUBSONIC MACH NUMBERS IN THE ABSENCE OF SHOCK WAVES, by A. D. Young and N. W. Winterbottom. Gt. Brit. Ministry of Supply. Aeronautical Research Council. May 1940. 16p graphs, table Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.75. PB 101663

A method is developed for calculating the profile drag of aerofoils in compressible flow at moderate Mach numbers in the absence of shock waves. The method is used to calculate the profile drag of an 18 1/2 per cent. thick symmetrical Joukowski aerofoil for a Mach number (U_o/a_o) of 0.685 at a Reynolds number of 10^7 and for a mean transition point position at 0.094c. Cover date is 1950. S. O. Code no. 23-2400. ARM RM 2400.

ON THE ANALYSIS OF STATISTICALLY INDETERMINATE STRUCTURES, by W. S. Hemp. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Nov 1946. 7p diagrs Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.40. PB 101713

This report develops a general method for the analysis of statically indeterminate structures. It concerns itself both with a rigorous demonstration of the validity of the methods and with recommendations for their successful practical application. An appendix gives a proof of the fundamental theorem. Cover date is 1950. S. O. Code no. 23-2396. ARM RM 2396.

ON THE EFFECT OF SUBSONIC TRAILING EDGES OF DAMPING IN ROLL AND PITCH OF THIN SWEPTBACK WINGS IN A SUPERSONIC STREAM, by Herbert S. Ribner. U. S. National Advisory Committee for Aeronautics. Aug 1950. 27p diagrs, graphs, tables Mi $2.00, Ph $3.75. PB 101381

The principal effect of subsonic trailing edges on the damping in roll and pitch of thin sweptback wings in a supersonic stream is evaluated in the form of approximate correction terms. These terms are to be added to the corresponding expressions obtained when the trailing-edge disturbances are ignored. Application is limited to plan forms and Mach numbers for which the trailing-edge disturbance does not extend beyond the leading edge and for which the area of mutual tip-trailing-edge interference is not large. NACA TN 2146.

PRESSURE DISTRIBUTION AND DAMPING IN STEADY PITCH AT SUPERSONIC MACH NUMBERS OF FLAT SWEPT-BACK WINGS HAVING ALL EDGES SUBSONIC, by Harold J. Walker and Mary B. Ballantyne. U. S. National Advisory Committee for Aeronautics. Cct 1950. 61p diagrs, graphs, tables Mi $3.00, Ph $8.75. PB 101858

The method of the superposition of conical flows is used to calculate both the pressure distribution and the derivative for the damping in steady pitch at supersonic Mach numbers of thin, flat, swept-back wings having all edges subsonic and straight. In general, the method consists in superposing a series of fields of conical and quasi-conical pressure in such a manner that the particular boundary conditions for steady pitch are satisfied. In this respect it closely parallels previous analyses made for steady lift and steady roll. The method is applied only to wings having zero rake at the tips. NACA TN 2197.

REVISIONS OF THE STANDARD FLIGHT-CHECK FOR THE AIRLINE TRANSPORT RATING BASED ON THE AIRLINE TRYOUT, by John A. Nagay. U. S. Civil Aeronautics Administration. May 1950. 48p diagr Mi $2.50, Ph $6.25. PB 101678
1. Pilots, Air - Ability tests 2. CAA 89.
Report on a project conducted by the American Institute for Research Incorporated, Pittsburgh, Pennsylvania, under the auspices of the National Research Council, Committee on Aviation Psychology with funds provided by the Civil Aeronautics Administration. See also PB 101676 and PB 101678.

REPORT ON ANALYSIS OF NAVAL AIRCRAFT ACCIDENT RECORDS, by Harry J. Older and Wilse B. Webb. Institute for Research in Human Relations, Washington, D. C. Final report. Aug 1950. 119p tables Mi $4.75, Ph $15.00. PB 101719
The study described in this report was undertaken, with the purpose of determining the extent to which flight safety data, collected primarily for administrative purposes, could be utilized in a comprehensive program of research designed to reveal (a) the basic causes of accidents and (b) steps to be taken in reducing the frequency and severity of airplane accidents. A further objective of this study was to outline such steps as seemed necessary in the way of improving methods of reporting and recording accident data in order that the usefulness of such data as research materials for the prevention of accidents might be increased. The findings of the investigation show that existing data, while not adaptable to rigorous statistical analysis, can yield some, although extremely limited, information on the nature and causes of airplane accidents. Report on research conducted by the Institute for Research in Human Relations, under the auspices of the National Research Council Committee on Aviation Psychology, under task order IX, contract no. N7onr-291, in cooperation with the Flight Safety and Statistics Branch of DCNO Air and the Division of Aviation Medicine, Bureau of Medicine and Surgery, U. S. Navy, with funds provided by the Bureau of Aeronautics, U. S. Navy, through the Office of Naval Research. NRC CAP 8.

SUMMARY OF SECTION DATA ON TRAILING-EDGE HIGH-LIFT DEVICES, by Jones F. Cahill. U. S. National Advisory Committee for Aeronautics. 1949. 33p diagrs, graphs, tables Available from Supt. of Documents, U. S. Government Printing Office, Washington 25, D. C. $.25. PB 101431
Data for plain, split, and slotted flaps are collected and analyzed. The effects of the variables involved in the design of the various types of flap are examined and, in cases where sufficient data are given, optimum configurations are deduced. NACA Report 938.

THEORETICAL CHARACTERISTICS IN SUPERSONIC FLOW OF TWO TYPES OF CONTROL SURFACES ON TRIANGULAR WINGS, by Warren A. Tucker and Robert L. Nelson. U. S. National Advisory Committee for Aeronautics. 1949. 19p diagrs, graphs, tables Available from Supt. of Documents, U. S. Government Printing

Office, Washington 25, D. C. $.20. PB 101432

The first type, the constant-chord partial-span flap, was considered to extend either outboard from the center of the wing or inboard from the wing tip. The second type, the full-triangular-tip flap, was treated only for the case in which the Mach number component normal to the leading edge is supersonic. For each type, expressions were found for the lift, rolling-moment, pitching-moment, and hinge-moment characteristics. NACA Report 939.

THEORETICAL SUPERSONIC CHARACTERISTICS OF INBOARD TRAILING-EDGE FLAPS HAVING ARBITRARY SWEEP AND TAPER. MACH LINES BEHIND FLAP LEADING AND TRAILING EDGES, by Julian H. Kainer and Jack E. Marte. U. S. National Advisory Committee for Aeronautics. Oct 1950. 39p drawings, graphs, tables Mi $2.25, Ph $5.00. PB 101853

Generalized expressions in closed form have been obtained by means of linearized theory for the aerodynamic characteristics (lift-, rolling-moment-, pitching-moment-, and hinge-moment-coefficient derivatives) due to deflection of inboard trailing-edge flaps. The analysis considers the effect of Mach number and flap aspect ratio, taper ratio, and sweep for the conditions where the Mach lines lie behind the flap leading and trailing edges. The flap configurations analyzed are limited to the case of streamwise tips where the foremost Mach lines from the flap tips do not intersect the root and tip chords of the wing. NACA TN 2205.

THEORY OF HELICOPTER DAMPING IN PITCH OR ROLL AND A COMPARISON WITH FLIGHT MEASUREMENTS, by Kenneth B. Amer. U. S. National Advisory Committee for Aeronautics. Oct 1950. 23p photos, diagrs, graphs Mi $2.00, Ph $3.75. PB 101885

A theory for the calculation of the damping moment about the helicopter center of gravity produced by a helicopter rotor during pitching or rolling is presented and compared with the results of flight-test measurements. Flight conditions at which the damping moment contributed by the rotor during pitching or rolling would tend to become unstable are discussed. NACA TN 2136.

WAVE DRAG OF DIAMOND-SHAPED AEROFOILS AT ZERO INCIDENCE, by A. Robinson. Gt. Brit. Ministry of Supply. Aeronautical Research Council. May 1946. 6p diagrs, graphs Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.40. PB 101712

1. Airfoils, Diamond-shaped - Drag - Gt. Brit. 2. ARC RM 2394.

Cover date is 1950. S. O. Code no. 23-2394.

WIND-TUNNEL INVESTIGATION AT LOW SPEED OF THE LATERAL CONTROL CHARACTERISTICS OF AN UNSWEPT UNTAPERED SEMISPAN WING OF ASPECT RATIO 3.13 EQUIPPED WITH VARIOUS 25-PERCENT-CHORD PLAIN AILERONS, by Harold S. Johnson and John R. Hagerman. U. S. National Advisory Committee for Aeronautics. Oct 1950. 30p photo, graphs, tables Mi $2.00, Ph $3.75. PB 101861

A wind-tunnel investigation at low speed was made to determine the lateral control characteristics of an unswept untapered semispan wing of aspect ratio 3.13 equipped with 25-percent-chord unsealed plain ailerons having various spans and spanwise locations. Variations of the lateral-control data with aileron span and spanwise location were determined through a large aileron-deflection range for various angles of attack up to about the angle of maximum lift. NACA TN 2199.

DIRECTION OF POINTER MOTION IN RELATION TO MOVEMENT OF FLIGHT CONTROLS; CROSS-POINTER TYPE INSTRUMENT, by John F. Gardner. U. S. Air Materiel Command, Wright Field, Dayton, Ohio. Jun 1950. 23p photos, graphs, tables Mi $2.00, Ph $3.75. PB 101631

1. Instruments, Aeronautical - Pointers 2. AAF TR 6016. Expenditure order no. 694-19.

EFFECT OF ILLUMINATION ON DIAL READING, by E. Laurence Chalmers, Mymon Goldstein, and William Kappauf. U. S. Air Materiel Command, Wright Field, Dayton, Ohio. Aug 1950. 30p photos, graphs, tables Mi $2.00, Ph $3.75. PB 101789

Interpolation and other local errors are found, for hard-to-read dials, to increase progressively as brightness decreases. Gross errors and reading times, on the other hand, change very little with decreasing brightness until a critical level is reached. This critical level is very similar for all dials with a given size of marking. Other data which are described indicate that the critical level for any given dial can be determined from number reading tests by obtaining judgments of minimum acceptable illumination levels from careful observers. Princeton University under USAF Contract no. W33-038-ac-14480, Expenditure order no. 694-15. AAF TR 6021.

EFFECT OF SCREENS IN WIDE-ANGLE DIFFUSERS, by G. B. Schubauer and W. G. Spangenberg. U. S. National Advisory Committee for Aeronautics. 1949. 43p drawings, graphs Available from Supt. of Documents, U. S. Government Printing Office, Washington 25, D. C. $.30. PB 101387

An experimental investigation at low airspeeds was made of the filling effect observed when a screen or similar resistance is placed across a diffuser. The filling effect is found to be real in that screens can prevent separation or restore separated flow in diffusers even of extreme divergence and to depend principally on screen location and pressure-drop coefficient of the screen. NACA Report 949.

HIGH-SPEED TIMING EQUIPMENT USED FOR THE WORLD AIR-SPEED RECORDS 1945 AND 1946, by S. P. Osborne, W. Goldsmith, and E. F. Jefferies. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Oct 1946. 22p photos, drawings, graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $1.15. PB 101665

This report describes the two systems used for timing the World Air-Speed Records (1945 and 1946). Assessments of minimum accuracy have been made. A summary of the results obtained in the 1945 and 1946 attempts are given in Appendix I. Tentative proposals for a new speed course are made in Appendix II. Cover date is 1950. S. O. Code no. 23-2376. ARC RM 2376.

MODIFICATION OF NAVIGATION EQUIPMENT IN NORTH STAR AIRCRAFT, by J. W. Whelan. Canada. Royal Canadian Air Force. Experimental and Proving Establishment, Rockcliffe, Canada. Jun 1950. 33p photos, fold drawings Mi $2.25, Ph $5.00. PB 101445

These modifications were required to facilitate the use of astro and radar as aids to navigation. Further modification was required to allow the Gyrosyn Compass to monitor the A-10 Automatic Pilot in northern areas where the Fluxgate Compass is unreliable. RCAF development report: Final D24-3/50. Reference: AFHQ letter 620-38-DO (AMTS/DD"A") dated August 1948. RCAF EPE 958.

NACA OIL-DAMPED V-G RECORDER, by Israel Taback. U. S. National Advisory Committee for Aeronautics. Oct 1950. 23p photos, diagrs, graphs, tables Mi $2.00, Ph $3.75. PB 101884

An NACA oil-damped V-G recorder has been developed in which viscous damping of the accelerometer results in improved frequency response, reduces susceptibility to vibration, and eliminates the necessity for field adjustments of damping. The airspeed element has been temperature-compensated and approximately linearized. The new V-G recorder and its performance characteristics are described and the results of tests, which demonstrate the improvements over the older design in which the accelerometer unit was friction-damped, are presented. NACA TN 2194.

SOME VARIABLES AFFECTING INSTRUMENT CHECK READING, by Shirley C. Connell. U. S. Air Materiel Command, Wright Field, Dayton, Ohio. Aug 1950. 14p photo, diagrs, tables Mi $1.75, Ph $2.50. PB 101787

As part of extended studies of human factors in aircraft instrument check reading, two studies were conducted in one of which subjects check read panels of simulated instruments, and in the other singly presented numbers ranging in size from two to seven digits. Expenditure order no. 694-27, Aero Medical Laboratory. AAF TR 6024.

STALLING RECOVERY AND STALL WARNING INSTRUMENTATION IN A LIGHT AIRPLANE, by Phillip J. Rulon and Kenneth W. Vaughn. U. S. Civil Aeronautics Administration. Jun 1950. 148p photos, drawings, graphs, tables Mi $5.75, Ph $18.75. PB 101679

Various methods of stall recovery were evaluated, and the supplementary use of stall warner equipment as a "flight instrument" investigated. Report on research conducted by the Educational Research Corporation under the auspices of the National Research Council Committee on Aviation Psychology, with funds provided by the Civil Aeronautics Administration. CAA 90.

STUDY OF THE ADEQUACY OF THE STALL-WARNING CHARACTERISTICS OF THE SNJ AIRCRAFT, by Wilbur E. Kellum, Phillip J. Rulon, J. J. Hill, Kenneth W. Vaughn and Jorma I. Niven. U. S. Bureau of Medicine and Surgery. Division of Aviation Medicine, and the U. S. Naval School of Aviation Medicine, Naval Air Station, Pensacola, Fla. Jul 1950. 69p photos, graphs, tables Mi $3.00, Ph $8.75. PB 101718

In these studies, the testing aircraft was equipped with a series of stall warners which were mounted along the leading edge of the wing and were adjusted to operate a switch at various flight attitudes between straight and level flight and some point before the stall occurred. The vanes introduced into the air stream were connected electrically with signal lamps mounted on a panel board in the examiner's cockpit. This device permits the making of records on individual pilots with respect to their approach and avoidance of the stall in any flight maneuver that may be of interest. Report on research conducted under the auspices of the National Research Council Committee on Aviation Psychology, by the School of Aviation Medicine, U. S. Navy, in cooperation with the Educational Research Corporation, with funds supplied in part by the Bureau of Medicine and Surgery, Division of Aviation Medicine, U. S. Navy under the provision of Task Order IX, Contract no. N7onr-291, through the Office of Naval Research. Project NM 001 058.04. NRC CAP 7.

STUDY OF THE MOVING FIGURE AND ORIENTATION OF SYMBOLS ON PICTORIAL AIRCRAFT INSTRUMENT DISPLAYS FOR NAVIGATION, by Thomas A. Payne. Illinois. University. Dept. of Psychology. Jul 1950. 26p diagrs, tables Mi $2.00, Ph $3.75. PB 101717

This study consisted of two separate experiments. In both experiments private pilots drew solutions to navigation problems, using printed drawings of pictorial aircraft instrument displays. The purpose of the first experiment was to compare performances of the subjects in drawing the movement which would be made by the moving figure of the display throughout the solution of the problem, when the moving figure represented (1) the station, and (2) the aircraft. The purpose of the second experiment was to compare performance of private pilots in drawing the figure movement for the solutions to navigation problems when the moving figure always represented the aircraft and in which there were different arrangements of two variables, namely, (1) the location of the fixed station, and (2) the orientation of the compass rose. Human engineering systems studies. SDC Human engineering project 20-L-1. Project designation NR-784-003. SDC TR 71-16-6.

UNTERSUCHUNGEN ÜBER DEN DIFFUSORWIRKUNGSGRAD UND ÜBER DIE ERZIELUNG EINWANDFREIER PARALLELSTRAHLEN BEI UBERSCHALLWINDKANÄLEN (RESEARCH ON THE EFFICIENCY OF DIFFUSERS AND THE ATTAINMENT OF TRUE PARALLEL RAYS IN SUPERSONIC WIND TUNNELS), by Dr. Klaus Oswatitsch. Kaiser Wilhelm Institut für Strömungsforschung, Göttingen, Ger. 1943. 60f photos, diagrs, graphs, tables (Text in German) Mi $2.75, Enl Pr $8.75. PB 101320

1. Diffusers, Supersonic - Germany 2. Wind tunnels, Supersonic - Germany
3. Micro BIOS FD 1806/48, Frames 475-519.

Abstract available as PB 101320s. 2p. Mi $1.25, Ph $1.25.

Engines and Propellers

ANALYSIS FOR CONTROL APPLICATION OF DYNAMIC CHARACTERISTICS OF TURBO JET ENGINE WITH TAIL-PIPE BURNING, by Melvin S. Feder and Richard Hood. U. S. National Advisory Committee for Aeronautics. Sep 1950. 39p Mi $2.25, Ph $5.00. PB 101773

The general form of transfer functions for a turbo-jet engine with tail-pipe burning was developed and relations among the coefficient and time constants in these functions were developed from engine thermodynamics and the transfer functions. By means of these relations, the dynamic characteristics of the engine can be found from steady-state data and one transient relation. The analysis was applied to determine the response of turbine-outlet temperature to step changes in the independent variables and was also applied to scheduled and noninteracting control systems. NACA TN 2183.

ANALYSIS OF EFFECT OF VARIATIONS IN PRIMARY VARIABLES ON TIME CONSTANT AND TURBINE-INLET-TEMPERATURE OVER-SHOOT OF TURBOJET ENGINE, by Marcus F. Heidmann. U. S. National Advisory Committee for Aeronautics. Sep 1950. 41p graphs Mi $2.50, Ph $6.25. PB 101617

An analysis is presented of the effect of primary variables on the time constant and turbine-inlet-temperature overshoot of a turbojet engine. The dynamic factors were calculated from thermodynamic equations of engine-component performance. The time constant can be corrected for engine size and altitude, whereas the tem-

perature overshoot requires no correction. Variations in component efficiency characteristics, exhaust-to-turbine nozzle-area ratio, and ram pressure ratio over a range normally encountered in operation indicate that they may independently vary the dynamic characteristics from 15 to 25 percent. NACA TN 2182.

AXIAL-MOMENTUM THEORY FOR PROPELLERS IN COMPRESSIBLE FLOW, by Arthur W. Vogeley. U. S. National Advisory Committee for Aeronautics. Aug 1950. 14p diagr, graphs Mi $1.75, Ph $2.50. PB 101380

As a first step in the formulation of a rational propeller theory for compressible flow, the compressible axial-momentum theory has been developed. Flow conditions significantly different from flow conditions in incompressible flow are predicted. Implications of the theory are discussed based on a study of propeller operation at a Mach number of 0.7. NACA TN 2164.

CALCULATED ENGINE PERFORMANCE AND AIRPLANE RANGE FOR VARIETY OF TURBINE-PROPELLER ENGINES, by Tibor F. Nagey and Cecil G. Martin. U.S. National Advisory Committee for Aeronautics. Aug 1950. 47p photos, graphs, tables Mi $2.50, Ph $6.25. PB 101428

An analysis was made of the performance of the basic, reheat, regenerative, and regenerative-plus-reheat turbine-propeller engines. The analysis covered an overall range of flight speeds from 200 to 500 miles per hour, altitudes from 0 to 50,000 feet, and turbine-inlet temperatures from 2000° to 3000° R for a range of compressor pressure ratios from 6 to 42. The effects of flight and engine conditions on fuel consumption, power per square foot of engine frontal area, power per pound of engine weight, and airplane range are shown and compared for several types of turbine-propeller engine. NACA TN 2155.

COMPARATIVE TESTS ON PROPELLERS WITH SIMULATED ICE AND WITH DE-ICING OVERSHOES IN 24-FT, TUNNEL, by A. B. Haines. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Dec 1946. 11p diagrs, graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.65. PB 101660

Tests have been made in the Royal Aircraft Establishment 24-ft. tunnel over a range of pitch settings and advance ratios on three two-blade propellers, consisting of: (1) a suitable design to serve as a datum; (2) this design with its leading edge modified (Fig. 1) to represent the possible effect of severe icing conditions; (3) the datum design fitted with de-icing overshoes. It is shown that the ice accretion on the blades produces an efficiency loss under typical operating conditions of about 14 per cent., while the particular feed shoes tested give a permanent loss in cruising efficiency of about 4-5 per cent, and hence of 3-4 per cent. in available range for a given payload. Cover date is 1950. S. O. Code no. 23-2397. ARC RM 2397.

DEVELOPMENT OF ROCKET FINS AND LUG-BAND KITS FOR USE WITH THE FLUSH-MOUNT LAUNCHER ON AIRCRAFT, FINAL REPORT SERIES W, NUMBER 18.4, by G. W. Engstrom and R. I. Beddoe. U. S. Allegany Ballistics Laboratory, Pinto, W. Va. Feb 1946. 49p photos, drawings Mi $2.50, Ph $6.25. PB 102153
1. Rockets - Fins 2. Rockets - Launching 3. Kits, Lug-band 4. HVAR (Rocket) 5. NDRC 3-H 6. OSRD 5787.

From Allegany Ballistics Laboratory, operated by the George Washington University under Contract OEMsr-273. National Defense Research Committee, Division 3, Section H.

EFFECT OF HEAT-CAPACITY LAG ON A VARIETY OF TURBINE-NOZZLE FLOW PROCESSES, by Robert B. Spooner. U. S. National Advisory Committee for Aeronautics. Oct 1950. 24p graphs, tables Mi $2.00, Ph $3.75. PB 101860

Computations of a number of turbine-nozzle flow processes including the effects of variable heat capacity and heat-capacity lag were made. The results of the computations are compared with the results obtained from similar computations based on the assumptions of equilibrium expansion and of frozen vibrational energy. NACA TN 2193.

INVESTIGATION OF FREQUENCY-RESPONSE CHARACTERISTICS OF ENGINE SPEED FOR A TYPICAL TURBINE-PROPELLER ENGINE, by Burt L. Taylor, III and Frank L. Oppenheimer. U. S. National Advisory Committee for Aeronautics. Sep 1950. 38p diagrs, graphs, tables Mi $2.25, Ph $5.00. PB 101616

Experimental frequency-response characteristics of engine speed for a typical turbine-propeller engine are presented. Correlation is made between these experimental data and analytical frequency-response characteristics. Results of this investigation indicate that engine speed is a linear function of fuel flow and propeller-blade angle for small variations of these parameters. Approximate frequency-response characteristics may be calculated from solutions of a linear differential equation and equilibrium torque characteristics of the engine and the propeller. NACA TN 2184.

METHOD FOR DETERMINING OPTIMUM DIVISION OF POWER BETWEEN JET AND PROPELLER FOR MAXIMUM THRUST POWER OF A TURBINE-PROPELLER ENGINE, by Arthur M. Trout and Eldon W. Hall. U. S. National Advisory Committee for Aeronautics. Sep 1950. 40p diagr, graphs Mi $2.25, Ph $5.00. PB 101776

Charts are presented by means of which the jet pressure ratio that gives optimum division of power between propeller and jet for maximum total thrust power may be determined for any turbine-propeller engine with or without intercooling, reheat, regeneration, or any combination of these modifications. For all conditions investigated, a simple equation for the jet velocity for maximum power from a basic turbine-propeller engine gave a value of jet velocity quite close to that calculated by use of the optimum jet pressure ratio from the charts. NACA TN 2178.

REVISED AND EXTENDED PERFORMANCE CHARACTERISTICS OF RAM JETS, by D. F. Collins and Francis M. Gordon. Gt. Brit. Ministry of Supply. Aeronautical Research Council. 1950. 42p diagr, graphs Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.75. PB 101781

Previous performance estimates of ram jets operating at the design conditions and using oblique shock intakes, are revised and extended. The range of maximum cycle temperature covers the highest value possible when burning kerosene at any particular altitude and operating at a flight Mach number between the limits of 1.0 and 3.0. At one value of maximum cycle temperature a comparison is made of the performance of ram jets when designed with either oblique or normal shock intakes. S. O. Code no. 23-9006-11. ARC CP 11.

TURNING-ANGLE DESIGN RULES FOR CONSTANT-THICKNESS CIRCULAR-ARC INLET GUIDE VANES IN AXIAL ANNULAR FLOW, by Seymour Lieblein. U. S. National Advisory Committee for Aeronautics. Sep 1950. 23p diagr, graphs, table Mi $2.00, Ph $3.75. PB 101777

Turning-angle-design rules for constant-thickness circular-arc inlet guide vanes, obtained from investigations of several conventional axial-flow compressor guide-vane designs in annular cascade, are presented. A linear relation between air turning angle and vane camber angle for the vane setting of zero angle of incidence was found for vanes in convergent annuli for the conditions of solidity of 1.4 to 1.7, inlet Mach number of approximately 0.3, and annulus area ratio across the vanes of from 0.86 to 0.95. The measured turning data were also corrected to constant inlet axial velocity in order to obtain a corrected design rule applicable over a wide range of axial-velocity ratio across the vane. NACA TN 2179.

TWO-DIMENSIONAL COMPRESSIBLE FLOW IN CENTRIFUGAL COMPRESSORS WITH STRAIGHT BLADES, by John D. Stanitz and Gaylord O. Ellis. U. S. National Advisory Committee for Aeronautics. 1950. 26p diagrs, graphs, tables Available from Supt. of Documents, U. S. Government Printing Office, Washington 25, D. C. $.25. PB 101863

Six numerical examples are presented for steady, two-dimensional, compressible, nonviscous flow in centrifugal compressors with thin straight blades, the center lines of which generate the surface of a right circular cone when rotated about the axis of the compressor. A seventh example is presented for incompressible flow. NACA Report 954.

Aerodynamics

AERODYNAMIC FORCES AND MOMENTS ON A 1 - SCALE MODEL OF A FIGHTER AIRPLANE IN SPINNING ATTITUDES AS 10 MEASURED ON A ROTARY BALANCE IN THE LANGLEY 20-FOOT FREE-SPINNING TUNNEL, by Ralph W. Stone, Jr., Sanger M. Burk, Jr., and William Bihrle, Jr. U. S. National Advisory Committee for Aeronautics. Sep 1950. 51p photos, drawings, graphs, tables Mi $2.75, Ph $7.50. PB 101552

An investigation was conducted to provide general information on the magnitudes and directions of the aerodynamic forces and moments exerted on a model of a fighter airplane in spinning attitudes as measured on a rotary balance installed in the Langley 20-foot free-spinning tunnel. The investigation included the determination of the effect on the aerodynamic forces and moments of reversing the rudder, of modifying the tail, and of deflecting the flaps and lowering the landing gear. NACA TN 2181.

AERODYNAMIC FORCES ON SLENDER PLANE- AND CRUCIFORM-WING AND BODY COMBINATIONS, by John R. Spreiter. U. S. National Advisory Committee for Aeronautics. 1950. 20p diagrs, graphs Available from Supt. of Documents, U. S. Government Printing Office, Washington 25, D. C. $.20. PB 101862

The load distribution, forces, and moments are calculated theoretically for inclined slender wing-body combinations consisting of a slender body of revolution and either a plane or cruciform arrangement of low-aspect-ratio pointed wings. The results are applicable at subsonic and transonic speeds, and at supersonic speeds, provided the entire wing-body combination lies near the center of the Mach cone. NACA Report 962.

ASYMPTOTIC SOLUTION OF A BOUNDARY LAYER SUCTION PROBLEM, by E. J. Watson. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Jul 1946. 8p tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.45. PB 101714

1. Boundary layer - Theory - Gt. Brit. 2. ARC RM 2298.
Cover date is 1950. S. O. Code no. 23-2298.

DENSITY FIELDS AROUND A SPHERE AT MACH NUMBERS 1.30 AND 1.62, by Paul B. Gooderum and George P. Wood. U. S. National Advisory Committee for Aeronautics. Aug 1950. 43p photos, diagrs, graphs, tables Mi $2.50, Ph $6.25.
PB 101483

Interferograms were taken of the flow around a sphere at Mach numbers of 1.30 and 1.62. The results of the evaluation of these interferograms are shown as plots of contours of constant density ratio in the flow field around the sphere and as the distribution of flow variables along the axis of symmetry between the shock wave and the sphere. In appendixes the theory of the analysis is reviewed, sources of error are discussed, and the detailed procedure used in the evaluation of the interferograms is described. NACA TN 2173.

SURVEY OF THE FLOW AT THE PLANE OF THE PROPELLER OF A TWIN-ENGINE AIRPLANE, by John C. Roberts and Paul F. Yaggy. U. S. National Advisory Committee for Aeronautics. Sep 1950. 175p photos, diagrs, graphs Mi $6.50, Ph $22.50.
PB 101774

The flow field at the plane of the port propeller, propeller removed, of a full-scale twin-engine airplane has been surveyed. Test variables were angle of attack, nacelle inlet mass-flow ratio, and wing-flap deflection. Measured upwash angles are compared with those calculated for the wing, using lifting-line theory. The effect of the flow field on oscillating aerodynamic loading on a propeller and the method of using the flow-field data in calculating this loading are indicated. NACA TN 2192.

THEORETICAL VERIFICATION AND APPLICATION OF TRANSONIC SIMILARITY LAW FOR TWO-DIMENSIONAL FLOW, by W. Perl and Milton M. Klein. U. S. National Advisory Committee for Aeronautics. Oct 1950. 42p diagr, graphs Mi $2.50, Ph $6.25.
PB 101859

The transonic similarity law for two-dimensional flow derived by von Karman was investigated by an iteration procedure similar to that of the Rayleigh-Janzen and Ackeret-Prandtl-Galuert methods. The results show that the potential can be expressed as a power series in a single parameter that depends on Mach number, thickness ratio, and ratio of specific heats. By the iteration procedure, the second approximation for the flow past a Kaplan section was obtained in similarity form. The exact solution by Kaplan for the second approximation was examined and found expressible in the same similarity form. The exact numerical results to three approximations obtained by Kaplan for the Kaplan section and the circular arc have been reduced to transonic similarity form. NACA TN 2191.

WATER SUPPLY, SANITATION AND PUBLIC HEALTH

STUDY OF GROUND WATER RESOURCES IN THE RANDOLPH AIR FORCE BASE AREA WITH THE HYPOTHETICAL CONSIDERATION FOR MAINTAINING AND/OR IMPROVING THEM, by Frederick A. Rodewald, Charles H. Morhouse and E. Elbridge Morrill. U. S. Air Force. School of Aviation Medicine, Randolph Field, Tex. Nov 1949. 5p Mi $1.25, Ph $1.25.
PB 101024

1. Airports - Drainage 2. Landing fields - Drainage 3. Water, Ground 4. AAF SAM Proj 21-02-141.

WATER SUPPLY STUDY, KAWASAKI, JAPAN, PREPARED by F. S. Blach. U. S. Geological Survey. Military Geology Branch. May 1950. 18p Mi $1.75, Ph $2.50. PB 101499

1. Water supply - Kawasaki, Japan.

MISCELLANEOUS

DEVELOPMENT OF A LIGHTWEIGHT FLYER'S CLOTHING BAG FOR FIGHTER AIRCRAFT PILOTS, by L. D. Thorough Smith. U. S. Air Materiel Command. Engineering Division. Aero-Medical Laboratory, Wright Field, Dayton, Ohio. Sep 1949. 8p photos Mi $1.25, Ph $1.25. PB 101881

Factual data and conclusions are given. Photographs attached. AAF TSEAA MR 666-26A.

PRECAUTIONS AGAINST FIRE AND EXPLOSION IN UNDERGROUND CAR PARKS, BY A JOINT COMMITTEE OF THE BUILDING RESEARCH BOARD OF THE DEPARTMENT OF SCIENTIFIC AND INDUSTRIAL RESEARCH AND OF THE FIRE OFFICES' COMMITTEE. Gt. Brit. Dept. of Scientific and Industrial Research. Building Research Board, and Gt. Brit. Fire Offices' Committee. 1950. 38p drawings, graphs Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.30. PB 101629

The object of this report is to review the general question of fire and explosion risks in underground car parks. It comprises a technical statement and recommendations which we trust will afford guidance to those authorities who may later be concerned in formulating rules and regulations for the construction and use of underground car parks. DSIR PWBS 28.

SOIL COMPACTION INVESTIGATION, REPORT NO. 5: MISCELLANEOUS LABORATORY TESTS, by A. A. Maxwell and C. D. Burns. U. S. Waterways Experiment Station, Vicksburg, Miss. Jun 1950. 109p photos, graphs, tables Available from U. S. Army. Corps of Engineers. Waterways Experiment Station, Vicksburg, Miss. $1.00. PB 101510

Report presents the results of several special laboratory investigations of certain factors which enter into the preparation of test specimens for the CBR penetration test. Also presented are the results of a study to develop a suitable standard compaction test for cohesionless materials. See also PB 110150 - PB 110153 for reports 1-4. WES TM 3-271, Report no. 5.

USAF RESCUE AND SURVIVAL EQUIPMENT CONFERENCE, 4-5-6 APRIL 1950. U. S. Air Materiel Command. Engineering Division. Aero-Medical Laboratory, Wright Field, Dayton, Ohio. Jun 1950. 27p Mi $2.00, Ph $3.75. PB 101701

The minutes of this conference cover the current situation as regards status of present equipment, and outlines the thinking in regard to the overall situation.

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	Title	Date
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SB-3	Plastics	Jan 1949
SB-4	Glass and Glass Technology	Mar 1949
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